DEC 1 1924

MECHANICAL ENGINEERING

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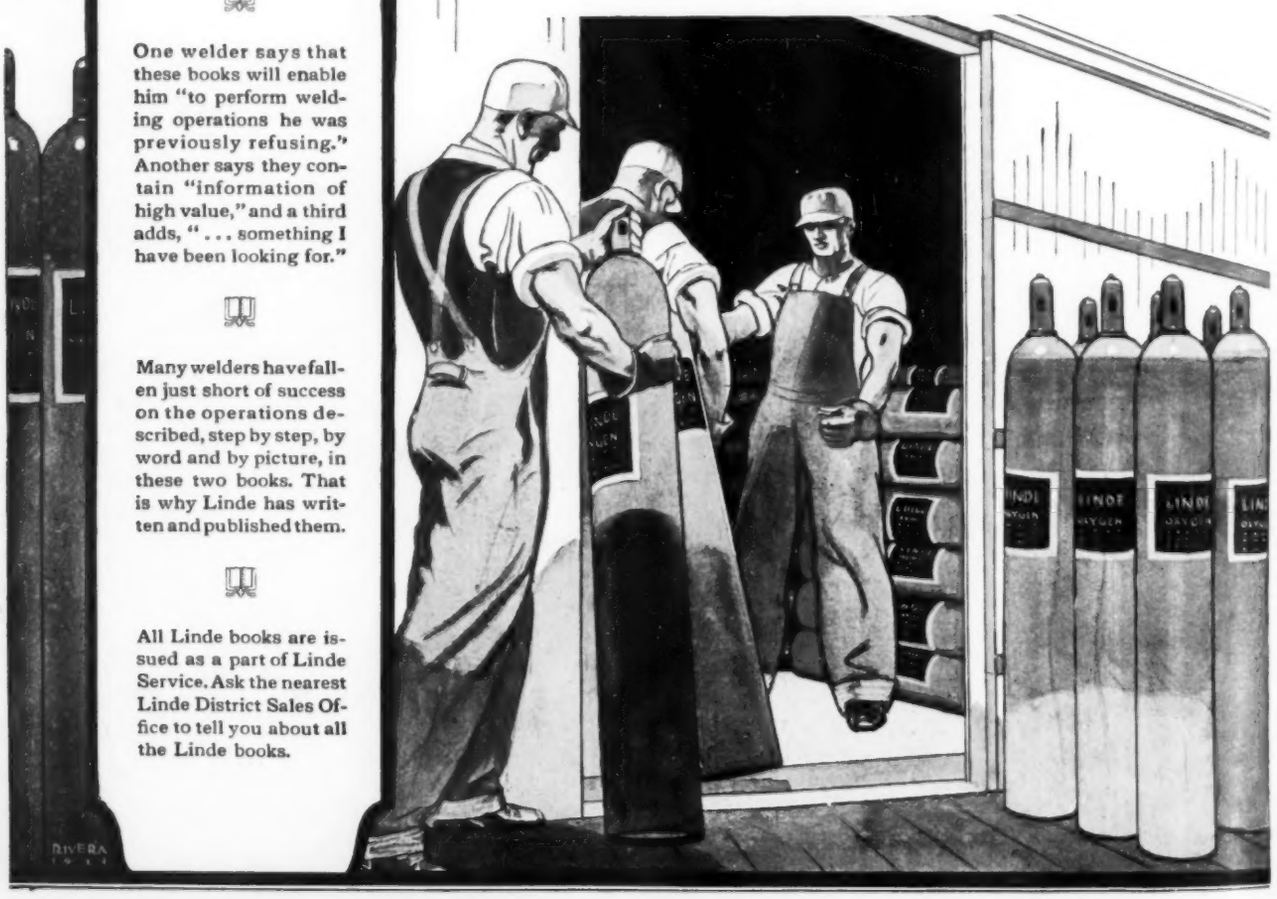

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The Monthly Journal Published by

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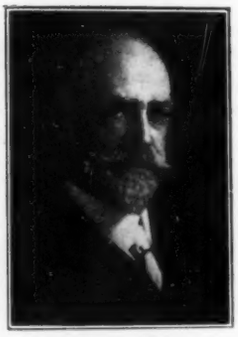
C. M. JOHNSON

W. F. RITTMAN



W. F. DURAND

R. E. FLANDERS

S. B. ELY

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Dr. Rittman received his A.B. from Swarthmore in 1908 and his Ph.D. from Columbia. He entered the business world as chemist for the United Gas Improvement Co. of Philadelphia. For seven years, from 1914 on, he was chemical engineer with the U. S. Bureau of Mines. He became head of the Department of Commercial Engineering at Carnegie in 1921.

* * * * *

William F. Durand who writes on Simpson's Rules Generalized, was graduated in 1880 from the United States Naval Academy. He served for seven years in the Navy and then entered the teaching profession, first at Michigan State Agricultural College and then at Cornell University. From 1904 to June of this year he has been professor of mechanical engineering at Stanford University. A complete account of Doctor Durand's career was presented in the *A.S.M.E. News* for June 22, 1924.

* * * * *

Ralph E. Flanders, director and manager of the Jones & Lamson Machine Tool Co., Springfield, Vt., writes on the Design, Manufacture and Production Control of a Standard Machine. Mr. Flanders became designer for the International Paper Box Machinery Co., Nashua, N. H., in 1901. From 1905 to 1910 he was associate editor of *Machinery*, and then became connected with the Fellows Gear Shaper Co. He has been with the Jones & Lamson Co. since 1912.

* * * * *

C. M. Johnson, who writes on The Manufacture of Gasoline, was educated in the public schools of California and is a graduate in the class of 1906 of the California School of Mechanical Arts. When the Cities Service Co. formed the Empire Companies with headquarters in Oklahoma, Mr. Johnson was employed as designing engineer. In July, 1923, he accepted the position of chief engineer of the Invincible Oil Co. of Shreveport, La. He is now with the Pierce Petroleum Corporation as designing engineer.

* * * * *

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* * * * *

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* * * * *

Hasbrouck Haynes, author of The "Manit" System for Measuring and Stimulating Labor Effort, is president of the Haynes Corporation, engineers, in Chicago. Mr. Haynes was graduated from Stevens Institute of Technology in 1910 with the degree of M.E. During his career he has been associated with James Newton Gunn at South Bend, Ind., and Detroit, Mich., the Studebaker Corporation of Canada, Ltd., and the Packard Motor Car Co.

* * * * *

Max Thornburg and **Frank L. Maker,** co-authors of Economic Features of Heat-Exchanger Design, are both connected with the El Segundo Refinery of the Standard Oil Co. of California, as assistant chief engineer of the manufacturing department and as designs engineer, respectively. Mr. Thornburg was graduated from the University of California in 1917, later taking graduate work at the University of Grenoble, France. He served three years as captain in the 46th Artillery of the A. E. F.

Mr. Maker was graduated from the University of California in 1916. He spent two years, 1917 to 1919, as an engineer officer in the Army.

L. A. QUAYLE

M. THORNBURG

F. L. MAKER

H. HAYNES

MECHANICAL ENGINEERING

Volume 46 December, 1924 No. 12

Industrial Power of the Pittsburgh District outside That of the Iron and Steel Industry

By SUMNER B. ELY[1] and W. F. RITTMAN,[1] PITTSBURGH, PA.

THE Carnegie Institute of Technology, through its Commercial Engineering Department, is conducting a major investigation of present power requirements and future power possibilities in the Pittsburgh District (1) with relation to the community and its development as a whole, and (2) with relation to the various specific industries of the community.

In the first communication in connection with this inventory (Mechanical Engineering, July, 1923) the authors presented data covering variations in costs and amounts of fuel used over a ten-year period, the relation between boiler capacity and the steam produced therefrom, and other pertinent data having to do with power in the production of iron and steel in the Pittsburgh district. The rather startling fact was developed that the iron and steel industry of the Pittsburgh district uses more than four billion boiler-horsepower-hours. To better emphasize this volume, it was brought out that if the boiler-horsepower-hours as shown in the Pittsburgh power-study curve for the year 1920 are put into equivalent kilowatt-hours, it will be found that this figure is about two-thirds of the total industrial kilowatt-hours for the same period as given in the Super-power Survey for the region between Boston and Washington lately published by W. S. Murray and others.

Fig. 1 The Pittsburgh District Studied, which Embraces the Area within a Radius of Thirty Miles from the City's Center

In the second communication (*Electrical World*, June 21, 1924) the authors presented data pertaining to central-station power of the Pittsburgh district. Overall capacity and volume-output figures were detailed, as well as analyses showing variations in output over the different hours of the day, over the different days of the week, and over different months of the year. Peak loads over the ten years under observation were plotted, and projections of requirements into the near future were attempted. One of the high lights of this phase of the authors' study was the finding that due to a combination of reasons, such as the substitution of large-capacity central-station units for miscellaneous isolated units and of the turbine for other prime movers, the amount of power derived at the bus bar from a ton of coal is today two hundred and fifty per cent of what it was in the Pittsburgh District a short ten years ago. Despite the importance of central-station power to the Pittsburgh district, it was found that the power output of the iron and steel industry for the district is approximately four times the output of central power stations in the same district.

The purpose of the present communication is, first, to present facts and data relating to total industrial power of the Pittsburgh district; second, to indicate changes and trends in industrial power of the district and their influence on industry of the district; and third, to show the relationship existing between power and population and the tendency to develop further and further from congested centers.

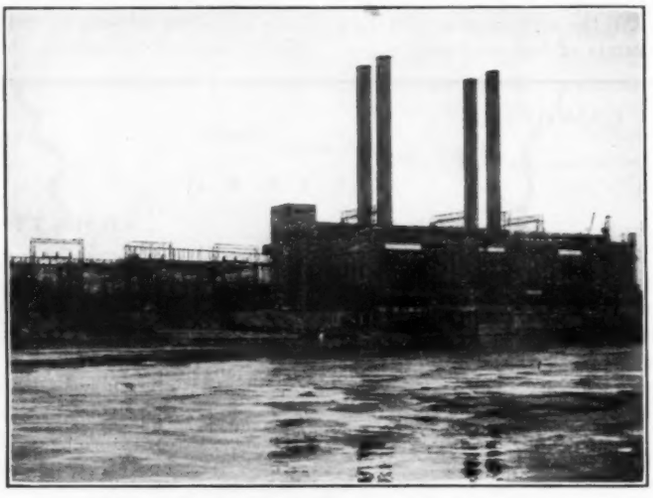
The method of procedure followed in developing this survey or inventory of power in the Pittsburgh district has been described in the prior communications referred to. While the authors made use of information compiled by the Federal Census Bureau, the Pennsylvania Department of Internal Affairs, the American Iron and Steel Institute, and various technical and industrial publications, nearly all of the information was derived from primary sources and in all cases reviewed by engineers whose experience and judgment added value to the findings. Because of the importance of Pittsburgh as a power center and because of the number of engineers and economists in the district interested in power, the authors were fortunate in being able to associate with themselves in this effort an information or "steering" committee which consisted of leaders in the field. The effort was further greatly helped by the willingness of representatives of different institutions in the district to sit about a common table in an effort to find common denominators for the various ways of keeping records and accounting in the district.

As was brought out in the previous article, corporate Pittsburgh, because of its greatly restricted territory, does not represent industrial Pittsburgh. A glance at the various charts referred to later will show that the population and power in the district outside of Allegheny County are at least 50 per cent of that within the county, and that the corporate city of Pittsburgh represents

[1] Professors of Commercial Engineering, Carnegie Institute of Technology. Consulting Engineers for the Giant Power Survey of the State of Pennsylvania.

General View of Pittsburgh

only a part of Allegheny County. The corporate limits of the city have never been expanded in any wise commensurate with the growth of its industries nor comparable with the expansions of the corporate limits of other metropolitan districts. The area selected for this study was that of the circle struck with a radius of thirty miles from the Pittsburgh City-County Building as the center (see Fig. 1), because the people and industrial plants comprised within it are intimately associated with and largely dependent upon the facilities of corporate Pittsburgh. Practically all the industries covered by this area, as well as a considerable portion in addition, clear through corporate Pittsburgh both physically and financially. This can best be illustrated by the fact that bank clearings in Pittsburgh amount to approximately $30,000,000 daily. The following data in regard to areas of Pennsylvania and of the Pittsburgh district, installed horsepower, etc., are also of interest:



Colfax Power Co., Duquesne Light Company
Present capacity, 160,000 hp.; ultimate capacity, 400,000 hp.; "mouth of the mine" plant; additional unit of 80,000 hp. now under construction

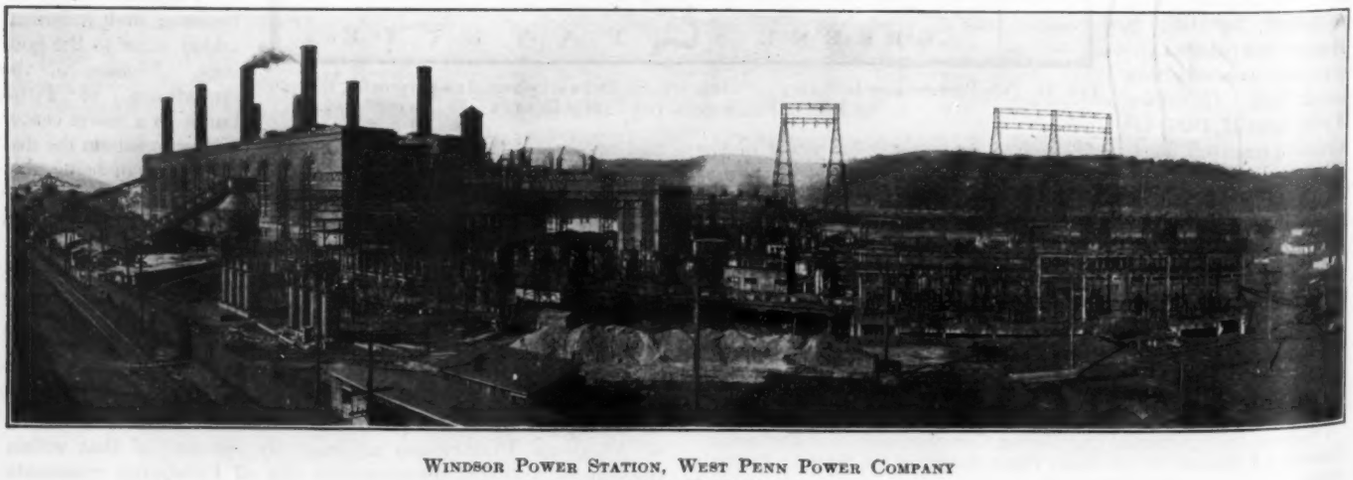
Area of state of Pennsylvania, square miles	45,126
Area of Pittsburgh district, square miles	2,827
Installed industrial horsepower in state in 1922	4,633,594
Installed industrial horsepower in Pittsburgh district in 1922	1,518,342
Percentage of state's area in Pittsburgh district	6.3
Percentage of state's installed power in Pittsburgh district	33.0

Changes in Industrial Pittsburgh

Pittsburgh is known throughout the world as the "Steel City," and the iron and steel industry still constitutes the major and most important phase of the city's industrial activity. For some years, however, the expansions in industries other than iron and steel have more than equaled the requirements of this major primary industry, as the diagrams show. This statement means that other diversified industries are accelerating and expanding at a much greater rate. Another outstanding characteristic of Pittsburgh power is the extensive use made of installed equipment. This is because much of the power developed in the district is for twenty-four-hour or continuous use, whereas in most other industrial centers the power is used as little as eight hours per day. This is partly because of the frame of mind of the Pittsburgh territory—which always thinks in terms of continuous operations—and partly because many of the industries of the district require continuous twenty-four-hour power.

This is further borne out in Fig. 2, covering purchased electric energy used in all industries of the Pittsburgh district except steel and iron. While the principal industry of the district—steel and iron—consumes relatively little purchased energy, it will be noted that the per capita consumption in the district with the principal industry omitted is greater than the average in the state. The state of Pennsylvania in turn uses more industrial power than any other state in the Union. When the operations in the steel industry are included, the energy used per capita in the Pittsburgh district is twice that of the state average.

Practically all of the activities of the people of the Pittsburgh district have to do with the use of power, either directly or indirectly.



Windsor Power Station, West Penn Power Company
Capacity 180,000 kw.

This can best be appreciated when one realizes that the installed horsepower per workman for the city of Philadelphia is approximately four and a half; for the state of Pennsylvania, about four; and for the Pittsburgh District, slightly over six.

Fig. 3 is presented to show the installed industrial equipment as of 1922 in the Pittsburgh district, and indicates the relation between installed capacity in the iron and steel industry as contrasted with other industries of the district. Expressed in numbers, this means that 897,551 hp. are installed in the iron and steel industry, and 620,791 hp.—including motors for purchased power—are installed in other industrial plants of the district. In other words, 59.5 per cent of the total industrial equipment is in the iron and steel

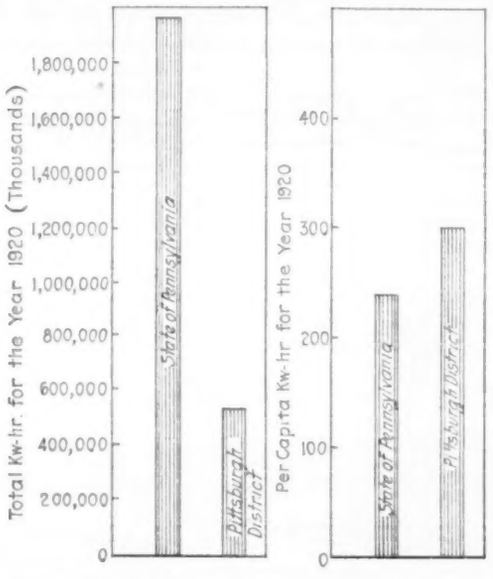


FIG. 2 COMPARISON OF TOTAL AND PER CAPITA ELECTRIC ENERGY SOLD TO ALL INDUSTRIES EXCLUSIVE OF IRON AND STEEL IN THE STATE AND THE PITTSBURGH DISTRICT

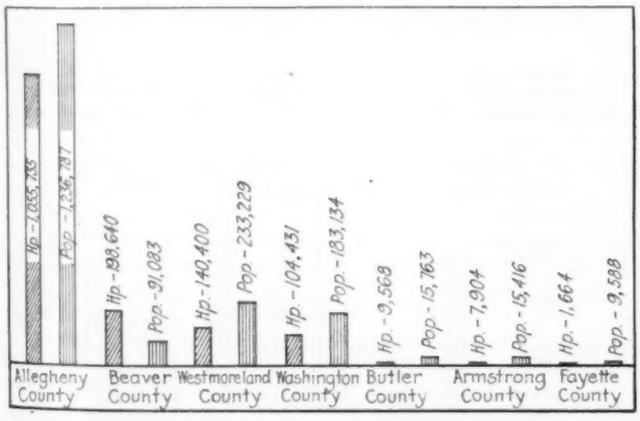


FIG. 4 POPULATION AND INSTALLED INDUSTRIAL POWER OF THE PITTSBURGH DISTRICT IN THE YEAR 1922

industry, and 40.5 per cent in other industries. It will be noted, however, from Fig. 7 that the consumption of energy (the horsepower-hours) in the steel industry is about twice that of other industries, although the installed horsepower of the former is only 59.5 per cent of the total.

Fig. 4 is presented to show the intimate relationship existing between installed power and population in that portion of the counties included in the Pittsburgh district. It is an old axiom that "population follows power," which coincidence exists in a striking way in these counties of western Pennsylvania. Heretofore the pronounced tendency has been to move people to the source of power; the effort of engineers and economists today is to move power to people economically. In other words, with the economical transmission of power this particular condition, which probably is largely responsible for congested cities, will no longer exist. In Fig. 4 one is struck by the closeness with which the two lines for each county match one another. A study of geography and location of industry for the counties under observation shows that power development and industry heretofore have planted themselves adjacent to the rivers, accounting for the small volumes of power in Butler and Armstrong counties. With the efficient transmission of power this latter limitation will be removed, because with the development of large-unit central-station power plants placed adjacent to coal and water and whose primary and special business is the development of power, the manufacturer can locate his plant with relation to labor supply and to cheap, desirable lands, and rely upon unlimited power being delivered to his plant at a cost less than when he developed his own power. The tendency of industry and population to follow the river courses is shown in Fig. 5, in which each dot represents 1000 people.[1]

Fig. 6 is presented to show the trend in the capacity of installed horsepower for the iron and steel industry as contrasted with other industries of the Pittsburgh district shown by the full lines.

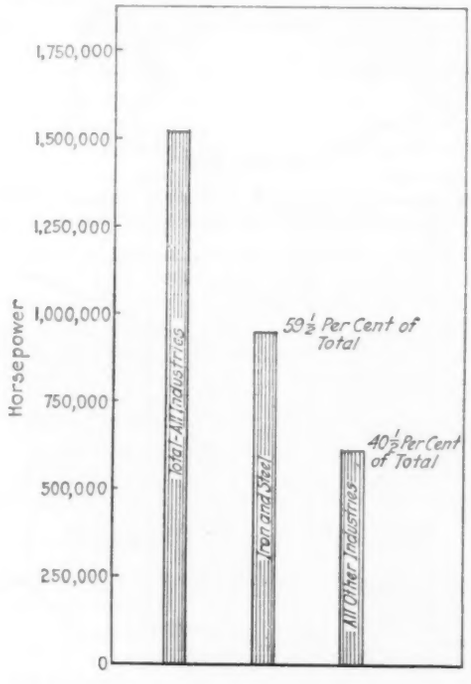


FIG. 3 PROPORTION OF INDUSTRIAL INSTALLED POWER IN THE IRON AND STEEL INDUSTRY IN THE YEAR 1922 IN THE PITTSBURGH DISTRICT

In connection with the other industries of the district, it is to be noted that prior to 1914 there was relatively little expansion in the power requirements of the other industries, whereas since that time there has been a marked and continuous growth in the power requirements of other industries. This change is the result of a continued growth in diversified industries for the district which is not generally appreciated. The curves indicate that the steel industry is much more uneven in its development than is the case with the rest of the industries; and if any average of these curves were projected into the future it would show the industrial curve to be steeper than the curve representing the iron and steel industry; which is only another way of again stating that the other industries as a whole are growing faster than the iron and steel industry in the Pittsburgh district. The iron and steel industry in this report is considered made up of blast furnaces, steel works, and rolling mills. The other industries in the district might be divided into two groups as follows:

Industries Requiring the Use of Metals:

Brass, bronze, and copper products
Cars and general shop construction
Electric-machine apparatus and supplies
Boiler shops

[1] The authors are indebted to the Pittsburgh Chamber of Commerce for this map.

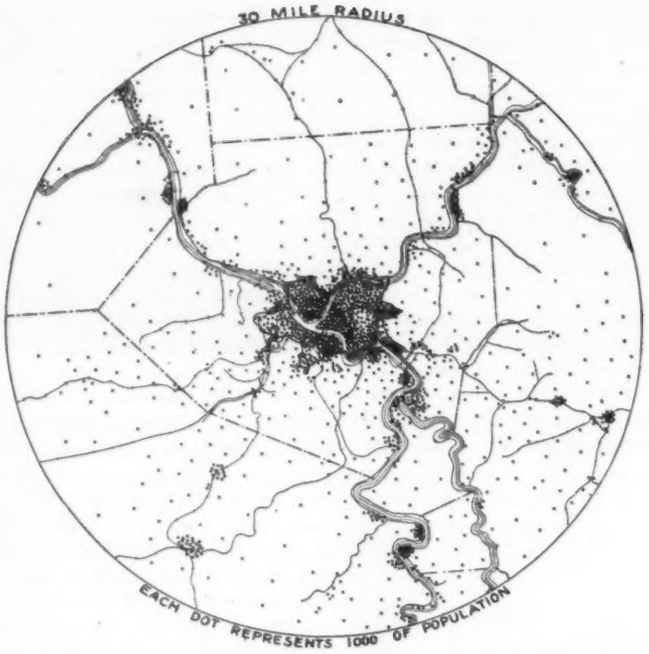


FIG. 5 MAP OF THE PITTSBURGH DISTRICT, SHOWING TENDENCY OF INDUSTRY AND POPULATION TO FOLLOW THE RIVER COURSES

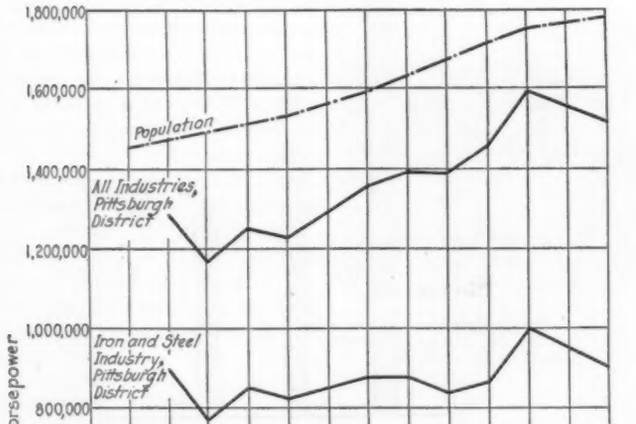


FIG. 6 DIVISION OF INSTALLED HORSEPOWER FOR THE PITTSBURGH DISTRICT

Foundries
Machine shops
Iron and steel, bolts, nuts, washers and rivets
Iron and steel forgings
Plumbers' supplies
Springs, steel
Steam fittings and steam and hot-water heating apparatus
Structural ironwork.

Principal Industries Not Using Metals:

Brick, tile, etc.	Ice
Glass	Lumber

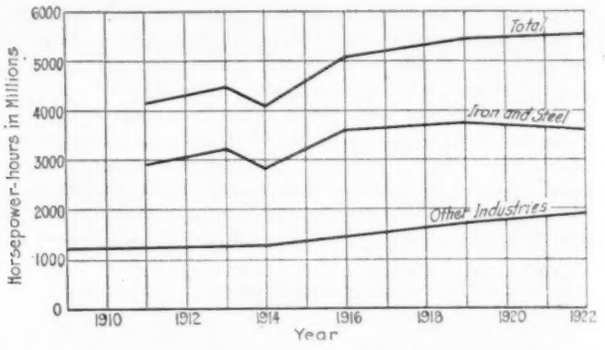
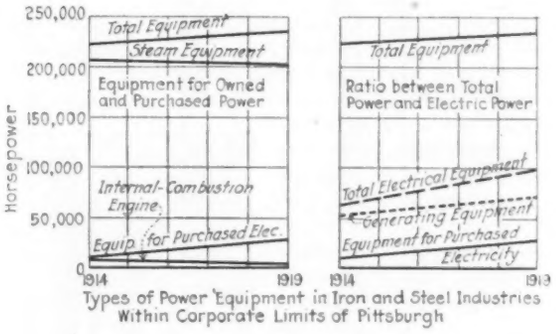


FIG. 7 INDUSTRIAL HORSEPOWER-HOURS IN THE PITTSBURGH DISTRICT



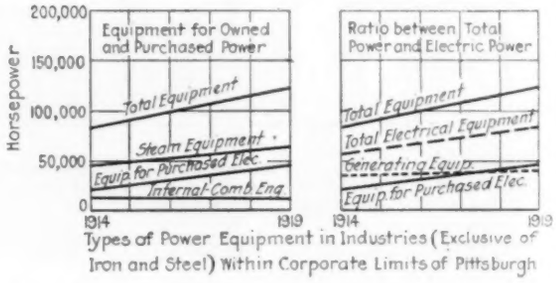


FIG. 8 CHARTS INDICATING DIFFERENCE IN DISTRIBUTION OF POWER EQUIPMENT IN THE IRON AND STEEL INDUSTRY COMPARED WITH THE OTHER INDUSTRIES WITHIN THE CORPORATE LIMITS OF PITTSBURGH

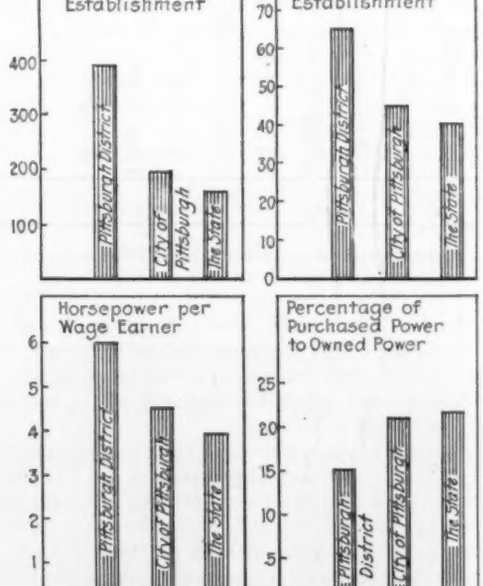


FIG. 9 POWER COMPARISONS OF THE PITTSBURGH DISTRICT WITH THE CORPORATE CITY OF PITTSBURGH AND WITH THE STATE OF PENNSYLVANIA

Bakeries	Paints
Chemicals	Printing
Food products	Meat packing
Greases	Cork products.

It is interesting to note that this expansion generally is in the outlying districts and away from congested living conditions, as indicated in charts further on. This is a very significant fact and, as was mentioned in a previous paragraph, the present-day power possibilities may modify our living conditions in a very far-reaching manner.

To emphasize the relative importance of the corporate city of Pittsburgh and the Pittsburgh district, compare the three full lines with the three dotted ones in Fig. 6. In the case of most large cities the industries within the city proper usually dominate the district, but the condition is reversed in Pittsburgh. Although the city itself is a center of great activity, the surrounding territory has almost three times the installed power. Now, taking into consideration the time that this equipment is in service, Fig. 7 has been plotted, based on horsepower-hours consumed from 1909 to 1922.

It will be seen that the iron and steel power-consumption curve has risen very little since 1916 and in fact has a tendency to fall,

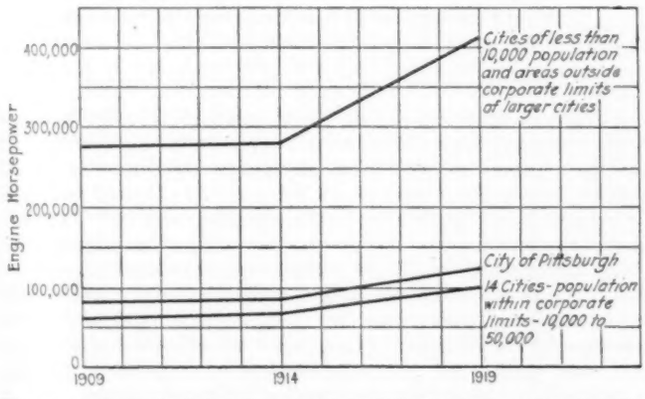


FIG. 10 INSTALLED POWER IN THE PITTSBURGH DISTRICT—ALL INDUSTRIES EXCEPT IRON AND STEEL

while the power curve of the other industries shows a marked increase. If this latter curve is projected into the future it indicates that there will be a large demand for power in the next few years in the Pittsburgh district other than that demanded by the iron and steel industry. This expected demand has resulted in large investments of the electric utilities in and adjacent to the Pittsburgh district. The large central stations that have been installed in recent years have made available cheap and relatively unlimited power, and there is no reason why the present rate of expansion and increase will not continue.

In some other studies the authors have made, the total industrial horsepower-hours in the entire state of Pennsylvania were found to be approximately twelve billion for the year 1922. This in connection with the total shown in Fig. 7 means that nearly one-half of the total industrial power of Pennsylvania is developed in the Pittsburgh district.

The two upper charts of Fig. 8 are to be compared with the two lower charts of the same figure, and indicate the difference in distribution of power in the steel and iron industry as compared with the rest of the industries. It will be seen that the steel industries purchase very little electrical power from the large central-station electrical companies, but that they possess considerable electrical generating machinery; whereas the capacity of the other industries for generating electricity is small and consequently they purchase a much greater proportion of their power from the electrical utilities.

It will be noted that no water wheels are shown as there is no water power in the Pittsburgh district. It is interesting to note that the internal-combustion engine has not increased over the period shown and that the steam installations have increased at about the same rate as the purchased electric power. A large part of this steam power, however, is converted into electric energy.

Fig. 9 is presented to show (1) the horsepower per establishment; (2) the number of wage earners per establishment; (3) the number of horsepower per wage earner; and (4) the percentage of purchased power to owned power for the Pittsburgh district, the city of Pittsburgh, and the state of Pennsylvania. These charts are self-explanatory and require little discussion. They emphasize the characteristics of the district, however, with respect to the volume of power required by the industries of the district.

Fig. 10 is presented to indicate graphically the pronounced trend of industry in the Pittsburgh district to establish itself in the outlying sections rather than in the congested city limits.

Corporate Pittsburgh within the radius of thirty miles is surrounded by 159 separately incorporated communities, towns, and cities (see Fig. 5); all of which, however, are part of industrial Pittsburgh in that business activities clear both physically and financially through corporate Pittsburgh.

Fig. 10 emphasizes what has developed to be the outstanding characteristic of this study: namely, the very pronounced tendency of industry to locate over a wider range of territory away from the congested centers and high-priced land. The figure shows three curves giving installed horsepower from 1909 to 1919. The lowest curve shows the total horsepower of the 14 cities within the district having populations of more than 10,000 each. As the curves show, by far the greatest expansion has been in the smaller communities. Without presenting specific data, the studies of the authors show that this movement toward outlying territory commenced in about 1905, and has progressed with the use of electricity as power. It should be said, however, that this expansion has not been at the expense of the city proper, because the growth of outlying territory always is reflected in the big city which serves as a nucleus for a large territory. The rapid developments in means of efficient power transmission and a coördinated network of power-transmission facilities, all emanating from economically located large-unit power plants, is sure to accelerate this fortunate movement. Because the purpose of the authors is to restrict themselves to a study of power, no discussion of the many advantages of this movement will be made. It is refreshing, on the other hand, to realize how well the movement is under way.

Salvaging Waste Materials

THE basic principle of scrap disposal at the Schenectady Works of the General Electric Co. is that they classify scrap as early as possible for consumption at the mill or smelter where it will be used.

They sell generally to the mill from which they purchase the stock, since its offer is likely to be higher than the competitive price offered by dealers or by other mills. This applies to all metal scrap, except iron and steel, which they have found sells more advantageously to junk dealers than to the mills. If they were to sell the scrap without handling and sorting it would not bring in over 50 per cent of what they now get for it. Operating the scrap department costs them about 6 per cent of the selling price of the scrap and the profit yielded therefor can be plainly seen. Scrap comes to them varying from obsolete automatic machinery to the mixed grease and copper of wire-drawing dies. Large pieces are loaded right on the cars; smaller stuff comes in containers. The standard scrap can employed is simply a steel oil drum, punched with two lined eyelets for handling by grappling hooks or cables on cranes and hoists.

Scrap wire and cable are taken care of by burning off the insulation, the metal left being then sorted out and taken off to be remelted. Perhaps the most pretentious single operation in the scrap and salvage department has to do with the reclamation of babbitt metal. The only new material bought for the scrap department is metal for the babbitt room—tin, lead, antimony, etc. for rebuilding babbitt. A reverberatory melting furnace is operated for reclaiming lead dross, babbitt dross, etc. This furnace has a capacity of 25,000 lb. of metal in 24 hours.

Altogether the scrap and salvage departments employ between 45 and 50 men who handle about 50,000 tons of metal scrap annually that is worth at the present low market for scrap about $1,700,000 which can be considered the minimum amount received.—R. S. Emmert, in *Factory*, September, 1924, p. 340.

The Fairmount Pumping Station and Heating Plant

Particulars of Novel Features Incorporated in a New Station in Cleveland, Ohio, together with an Analysis of the Efficiency of the Various Steam Prime Movers Available for Water-Works Use

By L. A. QUAYLE,[1] CLEVELAND, OHIO

CLEVELAND'S new Fairmount Pumping Station and Heating Plant, located 3¼ miles from and 150 ft. above Lake Erie, has been constructed to meet the demand for an unusually varied service. Many of the features incorporated in its design and equipment present novel departures from conventional water-works and heating-plant practice, the most interesting of which are:

Turbines operating with 300 lb. steam pressure at the throttle and bleeding at 125 lb. gage approximately three times the quantity of steam required for straight condensing operation

Boiler- and pumping-room auxiliaries driven by water turbines having three independent supply systems to draw from, giving unusual simplicity and reliability

A large overhead coal bin for both continuous service and storage, with provision for easily transferring the coal from one section to another

A novel and simple type of air preheater incorporated in the smoke-flue design

The entire plant operated from the main operating floor, which makes possible the handling of eight main pumping units, four boilers, and all auxiliary equipment with an operating force of four men

The practice of testing all turbines, gears, pumps, blowers, and generators for main and auxiliary equipment in both the shop and after erection, rigidly adhered to.

In analyzing the characters of the various types of prime movers available, the results of the study made of the test performances of compound and triple-expansion engines and different types of turbines are given on a Mollier diagram in a form which visualizes the stages and cylinders in which the largest losses occur; and may contribute to directing the constructive attention of water-works engineers to the economies which can be evolved from entirely possible improvements in the efficiency of the steam-turbine type of prime mover.

General Data

The rapid growth of Cleveland with its corresponding rapid increase in water consumption has necessitated the working out and carrying on of a program of water-works construction which will require the expenditure of approximately $50,000,000 between the years 1920 and 1940. Two long lake tunnels, three large pumping stations and filtration plants, two large reservoirs, and several hundred miles of trunk main extensions are the principal works to be built during this twenty-year period.

Fairmount Pumping Station and Heating Plant is the first of the stations to be built in accordance with this program, and it is designed to pump the maximum quantity of water that it is economical to distribute from this one location, due principally to the fact that it would be both difficult and uneconomical to lay more distributing mains to the centers of consumption of the various service districts.

Fairmount Station is located on a 75-acre plot of ground which includes two large reservoirs and the Baldwin Filtration Plant buildings, and is about four and one-half miles from the business center of the city and about one mile from the intersection of Euclid Avenue and East 105th Street, a rapidly growing business district to which it supplies steam for building heating purposes.

This station has four major and two minor functions to perform:

1 Pump raw water from the Fairmount Reservoir (elevation 170 ft.) at a maximum rate of 200 m.g.p.d. (million gallons per day) into Baldwin Filtration Plant mixing flume, elevation 245.5 ft.

2 Pump filtered water from Baldwin Reservoir into the first high-service district at a maximum rate of 40 m.g.p.d.

3 Pump filtered water from Baldwin Reservoir into second high-service district at a maximum rate of 60 m.g.p.d.

4 Supply steam at pressures varying from 75 to 125 lb. in quantities from 5000 to 100,000 lb. per hr. to a municipal heating system which covers what is known as the Euclid-105th Street business and residence district

5 Supply steam at pressures varying from 3 to 10 lb. per sq. in. in quantities up to 15,000 lb. per hr. to the pumping station and filtration plant for heating purposes, the several filtration-plant buildings being approximately 3000 ft. from the station

6 Supply a.c. current to the pumping-station and filtration-plant buildings for lighting and power purposes at a maximum continuous rate of 400 kw.

Analysis of Steam-Prime-Mover Efficiency

In spite of relatively low fuel costs and high labor costs, water-works engineers have always striven to obtain the highest efficiency for their prime movers from machinery builders. At certain periods, new types of machines of reduced first cost and poor economy have found application in the pumping of water. An early case of this is typified by the introduction of the direct-acting duplex steam pump, which was finally forced out (even though its efficiency had been raised remarkably by the application of the Worthington compensating cylinders, which made expansive working of the steam possible) by developments which raised the efficiency of the steam and water ends of the crank-and-flywheel machine to values which stand today as records in performance for steam engines.

The centrifugal pump has now found extensive use in this field following the perfecting of a suitable reduction gear for connecting it to a steam turbine. The application of the centrifugal pump and relatively small-sized steam turbine to water-works service has resulted in a steady improvement in the efficiency of both and in the development of noiseless reduction gears for connecting the two.

There are indications just now that water-works engineers are directing considerable attention to the use of higher steam pressures and temperatures along the lines laid down by the designers of large central-station electric-generating plants. It would seem, however, that they should extend their studies of means for improving the economy of a pumping station to include not only the gain that lies in the use of higher steam pressures and temperatures, but that gain which can be realized in the water-works steam turbine. With this in mind, a study has been made of available turbine proposals, as well as of test records of other water-works machinery and of certain turbines used for electric-generating service approaching the water-works turbine in size.

In general this study has included proposals for two of the Fairmount Station turbines for which information was available that would permit of determining the internal hydraulic efficiency of the different stages of the machines. The test data included for the other machines have been of such detailed nature that the hydraulic efficiency of the different elements of these machines could be studied. This study has been summarized by plotting the expansion lines for all the machines on Mollier (total heat-entropy) diagrams. The test data cover a vertical triple-expansion and a horizontal cross-compound pumping engine, a pure reaction turbine, a new special type of European turbine, and a Westinghouse-Curtis two-row impulse element. All of the machines studied have been supplied with steam initially superheated, and all but the special European machine and the Westinghouse have exhausted at a comparatively high vacuum.

The expansion lines for the Fairmount impulse turbines are

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plotted on the Mollier diagram, Fig. 1, which also has expansion lines for all of the other units listed. The European Erste Brunner turbine test results are taken from a report made by Dr. A. Stodola of Zurich, Switzerland. The test results for the vertical triple-expansion pumping engine are from the official records of one of the Cleveland Water Department's Division Station units. The test results for the horizontal cross-compound pumping engine are those obtained on the official test of a recent installation for the city of St. Paul, Minn. The test results for the pure reaction turbine are from the shop tests conducted on a 5000-kw. 3600-r.p.m. Allis-Chalmers turbo-alternator unit now installed in the municipal plant of the city of Ashtabula, Ohio.

This study indicates that there is available to water-works engineers the possibility of an appreciable increase in the efficiency now obtained from the high-pressure stages or elements of the most generally used type of turbine in water-works service. It is a fact that is now rather generally understood that a steam prime mover is inherently more efficient when operating with steam superheated throughout the expansion range than when it employs moist steam. This means that, other factors being made equal, a turbine or engine expanding steam from a condition initially superheated down through the moist-steam field, should have a considerably higher efficiency in the superheat field than in the saturated or moist.

A study of Fig. 1 reveals that the reciprocating engines in the superheated field had the highest efficiency, it being in the neighborhood of 90 per cent. These engines, however, suffered due to the inability of their low-pressure cylinders to completely expand the steam.

The special European machine (Erste Brunner) was brought out with a view to overcoming the loss in efficiency unavoidably present when a Curtis type of stage or an insufficient number of Rateau stages is used.

The expansion line for the pure reaction turbine is favorable because it will be noticed the test covered a condition of relatively low steam pressure. The expansion line of the reaction turbine can also be taken as showing very plainly the gain inherent in the use of superheated steam when other factors are maintained on an equal basis. The expansion line for this machine was obtained by observations of the quality of the steam at different stages throughout the expansion. The expansion line of the Erste Brunner turbine contains one observation of the quality between the inlet and exhaust. The turbine was a two-cylinder machine and readings were taken of the steam pressure and temperature between the two cylinders. The engine expansion lines, especially that for the triple, also show plainly the inherent gain to be realized by the use of superheated steam. The quality of the steam at the exhaust from the high-pressure cylinder and from the intermediate-pressure cylinder was obtained from the test data with a fair degree of precision, so that the efficiencies given represent actual observed values.

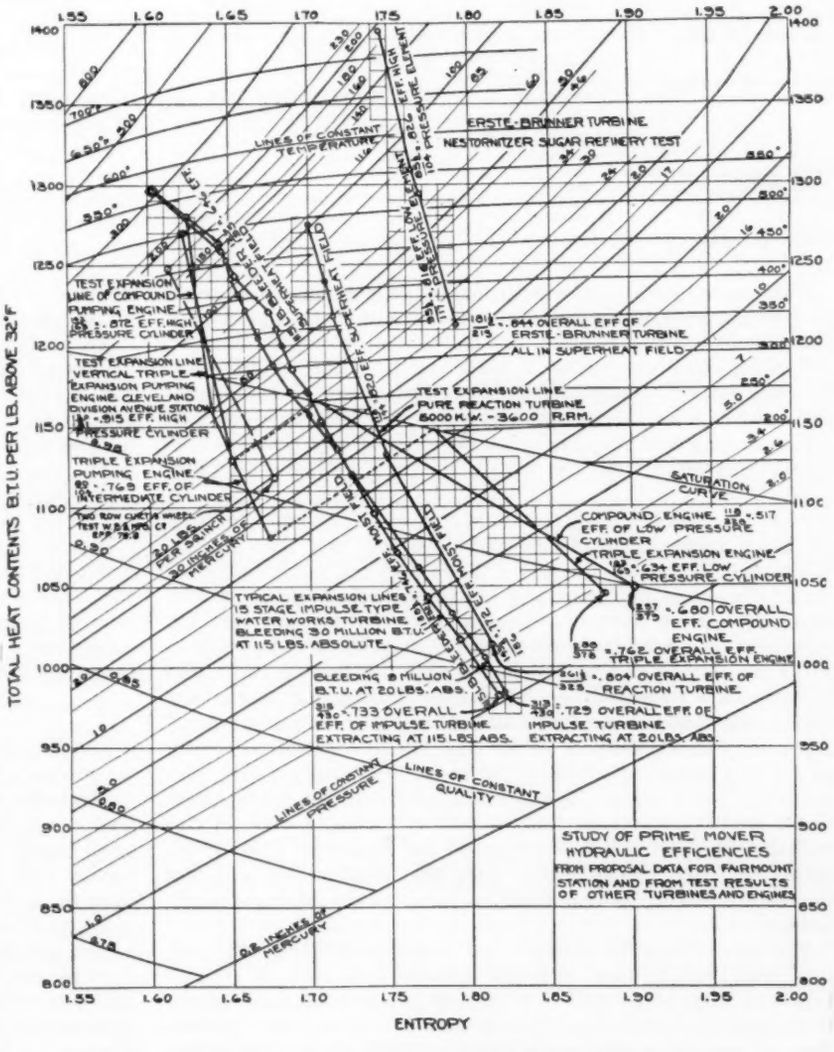

FIG. 1 EXPANSION LINES OF VARIOUS STEAM PRIME MOVERS PLOTTED ON A MOLLIER DIAGRAM

Table 1, which summarizes the efficiencies obtained for expansion in the superheated and saturated fields for all of the machines, shows the relatively low efficiency of the initial Rateau wheel through which a large heat drop is absorbed, and which therefore runs at an inefficient ratio between the blade and steam velocity. Considering the form of the expansion line for the proposed Fairmount machines and the test results of the Parsons type obtained with relatively low steam pressure, it is apparent that commercial turbines of the sizes under consideration have not been designed with a sufficient number of stages to take advantage of the energy available in the high pressures and superheats of the steam supplied to them. It would seem as though the increase in economy which would be obtained would more than offset the increased cost of the additional turbine stages required to effect it. In general terms it can be stated that the engine will give efficiencies of 90 per cent in the superheated field, while the best turbine efficiencies are between 82 and 86 per cent. These values compare with approximately 60 to 73 per cent for the Curtis type of two-row impulse wheel.

Only the very high overall efficiency of the triple-expansion crank-and-flywheel type of pumping engine has made it a successful competitor of the cheaper types of pumping machinery, since it has always been at a very great disadvantage as regards first cost, and at a somewhat lesser disadvantage as regards the limited capacities in which it can be built.

It is therefore not surprising in the light of the gradual increase in turbine and pump efficiencies that have been obtained during the last few years, that water-works engineers can no longer afford to pay $2\frac{1}{2}$ times as much for a triple-expansion engine as for a turbine-driven centrifugal pump with the possible exception of localities where fuel is very high in price.

In order to visualize what these gradual increases in the turbine gear-driven centrifugal type of pump mean, the author has computed the duty of a 30-m.g.p.d. pump of this type, working under a head of 250 ft. and developing 1315 water hp., the steam conditions being the same as those which obtained on the test of Allis-Chalmers engine No. 4 at Division Station, which, it is believed, holds the world's record for economy, and finds that a turbine gear-driven centrifugal unit can be built from practically standard equipment which will have a guaranteed Rankine-cycle efficiency of turbine and reduction gear of 72 per cent, a pump efficiency of 86 per cent, and, allowing $2\frac{1}{2}$ per cent for auxiliaries, will have a duty of 154.7 million ft-lb. of work per million B.t.u., compared with 173.8 obtained with the Allis-Chalmers engine at Division Station.

TABLE 1 EFFICIENCIES OF THE VARIOUS TYPES OF STEAM PRIME MOVERS STUDIED

Type of Unit	Construction of unit	Efficiency in Superheated field	Efficiency in moist field	Efficiency in high-pressure cylinder	Efficiency in intermediate-press. cyl.	Efficiency in low-pressure cylinder	Overall efficiency[1]	Efficiency of first Rateau stage with superheat	Efficiency of Rateau stages, superheat field	Remarks
Impulse turbine bleeding 30 million B.t.u. at 115 lb. abs.	Single-cylinder bleeder	0.646	0.746	.....	.....	.....	0.733	0.493	0.701	15-stage water-works turbine, Fairmount Station Cleveland, O.
Impulse turbine bleeding 9 million B.t.u. at 20 lb. abs.	15 Rateau wheels	0.668	0.720	.....	.....	.....	0.729	0.483	0.745	15-stage water-works turbine, Fairmount Station, Cleveland, O.
2-row Curtis impulse turbine	....	0.728		.....	.....	.....	.....	.....	.....	Westinghouse Electric and Manufacturing Co. test
Pure reaction turbine	Single-cylinder	0.820	0.772	.....	.....	.....	0.804	.....	.....	Official test of 5000-kw. unit at 3600 r.p.m.
Erste Brunner test (all in a superheat field)	2-Cylinder tandem, modified Rateau	0.844	.....	0.826	.....	0.816	0.844	.....	.....	Nestornitzer sugar refinery test; believed to have appreciable reaction in moving blades
Compound pumping engine	All Corliss gear, both cylinders jacketed	.....	.....	0.872	.....	0.517	0.680	.....	.....	Official test; jacket steam charged against engine
Triple-expansion pumping eninge	Corliss and single-beat poppet valves; all cyls. jacketed	.....	.....	0.915	.....	0.761	0.634	0.762	.....	Vertical triple-expansion pumping engine, unit No. 4, Division Sta., Cleveland, O., jacket steam charged against engine

[1] Rankine-cycle efficiency ratio.

The erected cost of the centrifugal-type pumping unit would be approximately 40 per cent of the erected cost of the triple-expansion engine.

The foregoing comparison is made on the steam conditions of Division Station, namely, 220 lb. abs., 520 deg. fahr. total temperature, and 28.2 in. vacuum, which, as far as is known, are as high a temperature and pressure as any engines of this type are now operating under. However, the turbine data are based on 29 in. vacuum.

It is a well-known fact that it is economical to build turbines for much higher temperatures and pressures than this, and for comparison's sake the duty of a 30,000,000-gal. pump operating under the same head-capacity conditions has been computed, assuming a steam pressure at the throttle of 500 lb. gage, 300 deg. superheat (or a total temperature of 767 deg. fahr.), and a vacuum of 29 in. It has also been assumed that the turbine and pump builders allow their designers a free hand in designing for the best obtainable efficiency and that a turbine and gear having an overall Rankine-cycle efficiency of 79 per cent can be constructed as well as a pump having an efficiency of 88 per cent, and on this basis a duty of 200.5 million ft-lb. per million B.t.u. can be expected. From present reports on the value of reheating, a duty of 216 million ft-lb. per million B.t.u. could be obtained. This is the actual net duty, deducting the extra heat required for reheating the steam. These duties include 2 per cent for the driving of auxiliaries.

The cost of building turbines and pumps of this high-efficiency type would not be over 20 points greater than that of present types, so they would still cost only 60 per cent as much as the triple-expansion engine but would have a duty as much greater than that of the triple-expansion engine as the duty of the triple-expansion engine is now better than that of the turbine. It would seem, therefore, that the future demand by water-works engineers for large triple-expansion pumping engines will be very limited.

Air Preheating

At the time this station was planned and its first equipment purchased—in the early part of 1922—there were no air preheaters on the market in this country, and very few data were available which could be used as a guide in making a decision as to its application to what is most probably the largest water-works boiler room yet constructed and which could not embody experimental applications such as are possible by the remodeling of an old plant when development work is carried on.

The gain from the use of the preheaters, as shown by authentic tests in marine boiler work and the experimental work done by the Cleveland Water Department in one of its old plants, in which a preheater made of old boiler tubes and plates was used, led to the devising of a flue construction having incorporated in it a preheated intake air passage as a part of the forced-draft-blower inlet duct.

The entire absence of manufactured air-preheater equipment rendered it necessary to make the design in the Department, and this has been accomplished in a way that is expected to allow an appreciable amount of preheating without jeopardizing the successful and reliable operation of the plant.

The smoke flue is made of brick and tile with a thin steel plate separating the flue gases on their way to the stack from the preheated air on its way to the stoker-blower inlet.

A cross-section of the smoke flue and heater is shown in Fig. 2, and a plan in Fig. 3. Louvers in the preheater section control the distance the air travels over the steel plate, which in turn regulates its temperature. The air which is drawn into the preheater louver has already been heated somewhat by the heat radiated from the boiler settings.

New Design of Coal Bunker

The Water Department's experience with two different plants, one having a large coal bunker and the other a small one compared to the boiler capacity, is fairly typical of the experience of others. Unless cars come with great regularity to the plant having the small bunker capacity, it is necessary to put a gang of men in the bunker with planks, wheelbarrows, and shovels to move the coal from the section of the bunker which supplies coal to boilers not in use to the section of the bunker in which the coal is low, or else a crew is put on to move the coal from the outside stock pile.

In the plant having a large bunker capacity the transferring of coal from the full to the empty sections of the bunker, either because it is needed in front of the boilers which are operating or because it is getting hot, is also necessary at times.

The design of the Fairmount Station bunker with its coal-handling equipment allows the transferring of the coal from one section of the bunker to another by the pivoted bucket conveyors. Approximately 80 per cent of the coal can flow by gravity through the boiler hopper spouts and 20 per cent can flow into the conveyors by gravity through the transfer spout. There is thus in effect a storage pile in the main coal bunker which can be transferred to wherever it is needed at the rate of fifty tons per hour with no labor other than the regular conveyor attendant.

The shower of coal dust which is sent to the boiler room when coal is transferred into the stationary or moving coal-weighing hoppers in our other stations will not have to be contended with in this plant. The boiler room should be practically free from coal dust.

Heat Balance and Auxiliaries

Due to the large seasonal variations in demand for water and high-

and low-pressure heating steam, the heat-balance problem required an unusual amount of study for its efficient solution. Reliability of the main and auxiliary equipment was of major importance; and in the design of the plant and selection of its equipment ease and economy of operation were carefully studied.

In the main pump room all operation is done from the main operating floor. The only auxiliary equipment in the entire plant below the main pump, auxiliary, or boiler-room floors are the condensate pumps, of which each unit has one. These pumps are driven by small water turbines (from 1.7 to 3.5 hp.) and are supplied with raw water under a head of 100 ft. from either one of three of the low-lift main units, and discharge against a head of 20 ft. into the tunnel which connects Fairmount Reservoir with the low-lift pumps.

Should all of the raw-water pumps be shut down through a break in the main or other accident, a pressure-regulating valve on the first high-service system will open automatically and supply the necessary water for condensate-pump operation for the remaining five units. Should both the low-service and first high-service supplies fail, which is extremely unlikely, an automatic valve on the second high-service system will open and supply the necessary water for condensate-pump operation. Since both the first or second high-service systems have sufficient reservoir capacities to run these pumps for several days and since the maintenance on the hydraulic turbines should be practically nil, this type of drive for this plant is unusually reliable and should require practically no attention.

Due to the extreme simplicity and reliability and excellent economy of the hydraulic-turbine drive, the four stokers, two of the three oil pumps for the central oiling system, and one boiler-feed pump are also driven in this manner. The water turbines used are built from standard pump cases with suitably designed propellers. On shop tests it was found that the efficiency of the water turbines for a given set of conditions was equal to or better than the corresponding pump efficiency. One brake horsepower at the shaft of the turbine driving the boiler-feed pump requires only 16.4 lb. of steam at the throttle of the main-unit steam turbine. Even the 2.9-b.hp. condensate-pump water turbines require only 24.5 lb. of steam per b.hp. at the throttle of the main unit.

Another unusual feature of this station is the location of all auxiliary equipment (except condensate pump and stoker drives), such as stoker blowers, feedwater heaters and pumps, water-softening apparatus, turbo-generators, switchboard, central-oiling-system pumps and tanks, air compressor and vacuum heating and cleaning pumps, in an auxiliary room which is separated from the main pump room by a series of open archways. The fact that all of this auxiliary equipment is in a clean, well-lighted room under the constant observation of the chief operators, should do much toward increasing its reliability and decreasing operating labor and maintenance costs.

It is interesting to note that even if the steam pressure in the plant went so low that no steam prime movers could operate, the boilers could be fed from the hydraulic-turbine boiler-feed pump, and the stokers could be driven by the hydraulic-turbine drives.

Demand for high-pressure bleeder steam, which varies from none in the summer to 100,000 lb. per hour on a cold winter day, is supplied to the heating system by any one of four bleeder turbines; and the demand for low-pressure steam for station heating and filtration-plant heating is supplied by two low-pressure bleeder turbines and also by two mixed-pressure turbines if these are in operation.

The saving by using bleeder steam instead of taking the steam for heating out of the boilers and running the main unit straight condensing, will be approximately $20,000 per year in 1935, when the station will have reached its maximum pumpage capacity.

Since none of the condensate from the steam sent into the municipal heating system is returned, the heating of this make-up for the eight heating months becomes an important item.

As the make-up water varies in temperature from 33 to 62 deg., with a weighted average of 41 deg. for the heating season, the heat in the exhaust steam from the main units, which otherwise is lost in the circulating water, is used to heat the make-up to approximately 95 deg., from which temperature it is increased to 210 or 220 deg., by the auxiliary exhaust and low-pressure bleeder steam. The heating through the low-temperature range is accomplished by passing all the make-up water from the water softener through several rows of tubes in the top section of the condensers of three of the main units. These heaters heat both the condensate of the turbine and the make-up water.

The station is designed for the future installation of closed feedwater heaters which will receive the boiler feedwater from the open feedwater heaters at a temperature of 210–220 deg. fahr. and heat it with steam from the high-pressure bleeder lines which also supply the municipal heating system, to temperatures varying from 350 to 400 deg. Under certain conditions a gain in overall economy of 5 per cent can be attained by this stage bleeding.

DETAILS OF STATION CONSTRUCTION AND EQUIPMENT

Station Construction. The foundations of the building and pumping units are on shale and the stack foundation on rock. The entire substructure is of concrete, the superstructure of steel with brick curtain walls. The interiors of the pump and auxiliary rooms are laid up with gray porcelain enamel brick with tile floors to match. Buff glazed brick are used in the boiler room, and in the machine, electric repair, and pipe shops. All the floors are made of reinforced concrete.

The plan of the operating floor of the pumping station, Fig. 3, gives the general dimensions and arrangement of the building; Fig. 2 shows the plant in cross-section.

The pump room is equipped with a 10-ton electric crane for handling the pumping machinery.

The auxiliary room, which is 26 ft. wide and one story high, with skylights in the roof, separates the main pump room from the boiler room and houses nearly all of the auxiliary equipment.

The floor above the pump room has well-lighted and well-equipped machine, pipe and electric repair shops, as well as a store room which is connected to the plant elevator by a monorail system. The chief engineman's office is on a mezzanine floor and overlooks the pump and auxiliary rooms.

Main Pumping Units. Three of the eight main pumping units, two of 75 m.g.p.d. and one of the 50 m.g.p.d., are supplied with raw water by gravity from Fairmount Reservoir and pump it into the filter plant, the total head on the pumps being approximately 80 ft.

The two first-high-service pumping units of 20 m.g.p.d. capacity each, are supplied with filtered water from Baldwin Reservoir under a head of 78 ft., and discharge it into the first high-service reservoir against an average pressure of 213 ft.

The three second-high-service pumps of 20 m.g.p.d. capacity each are supplied with filtered water from Baldwin Reservoir and discharge against a head of 478 ft., making the total net head on the pumps of 400 ft.

The three raw-water pumps and the two first-high-service pumps are of the single-stage, double-suction type. That shown in Fig. 2 is typical.

The single-stage pumps connected in series with the turbine would have been 41 ft. long or would have required a 10-ft. wider pump room than the other five pumps. The bidders were therefore requested to bid on pumps having two impellers in one casing.

All pumps have bottom suction and discharge nozzles which do away with the necessity of having steps over the discharge piping and gives the station the very best possible appearance.

Reduction Gears. The reduction gears for the 8 pumping units are of the standard DeLaval design; the spiral angle of the teeth is 45 deg. and the gear ratios vary from 1: 5.2 for the second high service to 1: 9.2 for the low-lift units. All pinions of the gears revolve in the direction which holds them down on their bearings as the load increases, but tends to lift the main gears. All gears are made sufficiently heavy so that this upward pressure is not sufficient to lift them from their bearings.

Turbines. Three of the eight turbines driving the pumps are designed to bleed steam out at a pressure of 125 lb. gage: two to bleed steam out at a pressure of 3 to 10 lb. gage, and two to bleed steam either at 3 to 10 lb. in the winter or take auxiliary exhaust steam in the low-pressure stages at from 0 to 3 lb. in the summer months.

The turbine types are so arranged that one of each type required will be in service under the minimum pumpage conditions.

Due to the high steam pressure and superheat the turbine casings are of electric cast steel, except the end of the casing which contains the exhaust nozzle. The turbine blades are all made of monel metal and are held in the disks by a shank-and-bulb construction. Fast couplings are used between the turbine shaft and the gear pinions and DeLaval couplings of the pin-and-rubber-bushing type are used between the gears and the pumps.

All diaphragms are of the built-up construction with the vanes of noncorroding material and are accurately assembled on the disks.

No flyball or sliding-weight type of governor with knife edges to wear or with springs, is used on these turbines. Instead, the pressure-volume characteristics of the gear-type oil pump, driven from the turbine shaft, is used. The oil pressure is increased in proportion to the square of the turbine speed, since the pump is discharging through an orifice of constant diameter, and this pressure acts directly on an operating piston connected with the turbine governing valve through a lever.

It is believed that this governing mechanism is as simple an arrangement as has yet been devised for units of this size. During the shop tests the speed regulation of the pumping units was excellent under changing loads, and the turbine speeds were changed 30 per cent under governor control. The author knows of no flyball type of governor which will do this.

Coal and Ash Handling. The main features of the boiler room and coal-bunker arrangement are shown in the cross-section of the plant, Fig. 2.

Coal is dumped out of the hopper cars into two concrete hoppers and conveyed by two steel apron conveyors to two coal crushers, whence it flows by gravity into two pivoted-bucket conveyors. The coal is weighed as the buckets carry it continuously over Blake-Dennison automatic scales; it is then discharged into the main coal bunkers which have a capacity of 3350 tons level full, or about fifteen days' supply for a continuous heavy load. The coal flows by gravity through the boiler-hopper spouts, which are equipped with Bailey meters, into the stoker hoppers.

The horizontal run of the conveyors is 168 ft. and the maximum vertical lift is 69 ft. 6 in. Each conveyor is driven by a motor through a worm drive.

The ash, after being ground by the clinker grinders, is discharged into the ash hoppers and then through hydraulic piston-operated gates into 30-cu-ft. industrial cars. These cars are run on to a hydraulic elevator which lifts them 8 ft. and the ashes are then discharged into hoppers which feed them into pivot-bucket conveyors, which in turn lift them to the ash bunker. The ashes are discharged out by gravity through two hydraulically operated gates into railroad cars or trucks.

Boilers and Superheaters. Four 1000-hp. Stirling boilers were installed instead of a greater number of smaller ones, since with softened water and proper furnace construction it should not be necessary to have a boiler down for cleaning or maintenance work but comparatively few days of each year. It is interesting to note that in one of the Water Department's old plants which had about half the boiler capacity, 17 boilers and 42 firemen were required. The boiler safety valves are set to blow off at 320 lb., and an average of 300 lb. is to be maintained at the turbine throttles.

The coal used by all of the Water Department plants is $1^1/_4$-in. No. 8 Ohio nut and slack, purchased on the B.t.u. basis, the following being the standard upon which the contract is based:

B.t.u. per lb.	12,600
Ash, per cent	12
Moisture, per cent	4
Sulphur, per cent	3.5
Average volatile matter, per cent	35
Average fixed carbon, per cent	49

Coal of the above characteristics is comparatively low in cost, the average price before the war being $1.60 per net ton delivered. The present price is approximately twice this. The type of stoker purchases and the boiler setting design are based on the use of this coal.

Boiler Settings. The boilers are set singly with 12-ft. 3-in. aisles between—see Fig. 3. Stairways and platforms between the boilers make all parts accessible for cleaning and maintenance work.

The settings are $22^1/_2$ in. thick, of solid firebrick. The combustion chambers are lined with 13 in. of No. 1 Walsh or Farber brick, the outside 9 in. of Dover Buckeye brick. The tops of the boilers are covered with Sil-O-Cel brick laid on edge.

The mud drums are set 11 ft. high, giving 24.5 cu. ft. of furnace volume per sq. ft. of grate surface. The lower parts of the furnaces are lined with non-clinkering air-cooled Drake or Bernitz block, air being supplied to these blocks from main air ducts through cast-iron boxes of Drake design, or through carborundum blocks of Bernitz design. McLeod-Henry block are used above the air-cooled block for several courses on two of the furnaces.

Stokers. Two of the plants operated by the Water Department have natural-draft chain-grate stokers and one has underfeed stokers. Several years of operation have shown that the underfeed-stoker plant maintains approximately 7 per cent better efficiency year in and year out with the same degree of care in the firing, as compared with the chain-grate plants.

Burning the No. 8 Ohio coal, an average of 25 per cent carbon in the ash is about as good as can be obtained with the underfeed stokers without clinker grinders, at an average load of approximately 150 per cent of rating, whereas 10 per cent to 12 per cent would be a fair carbon content for stokers equipped with clinker grinders. Each stoker is driven by a water turbine directly connected to a Cleveland worm gear. The

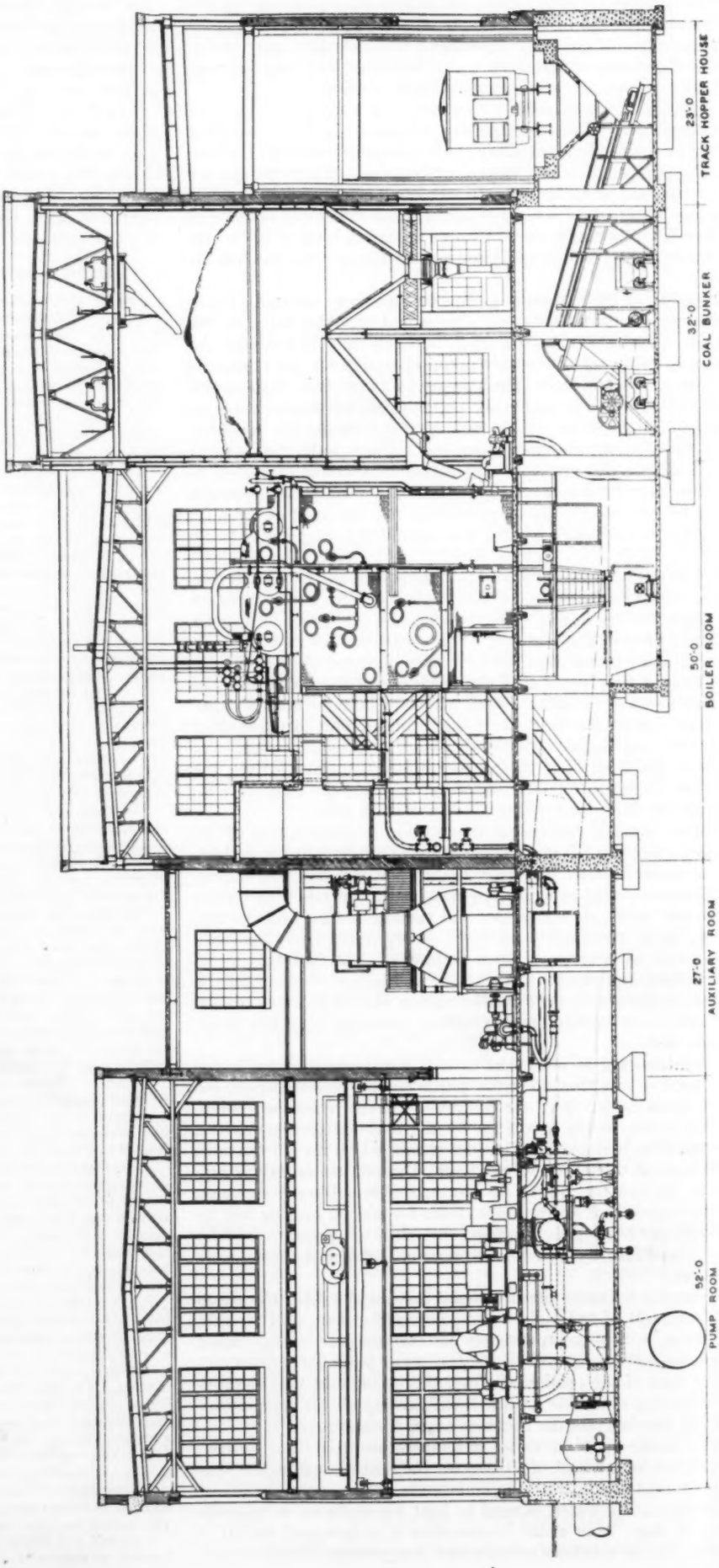

FIG. 2 CROSS-SECTION OF THE FAIRMOUNT PUMPING STATION AND HEATING PLANT, CLEVELAND, OHIO

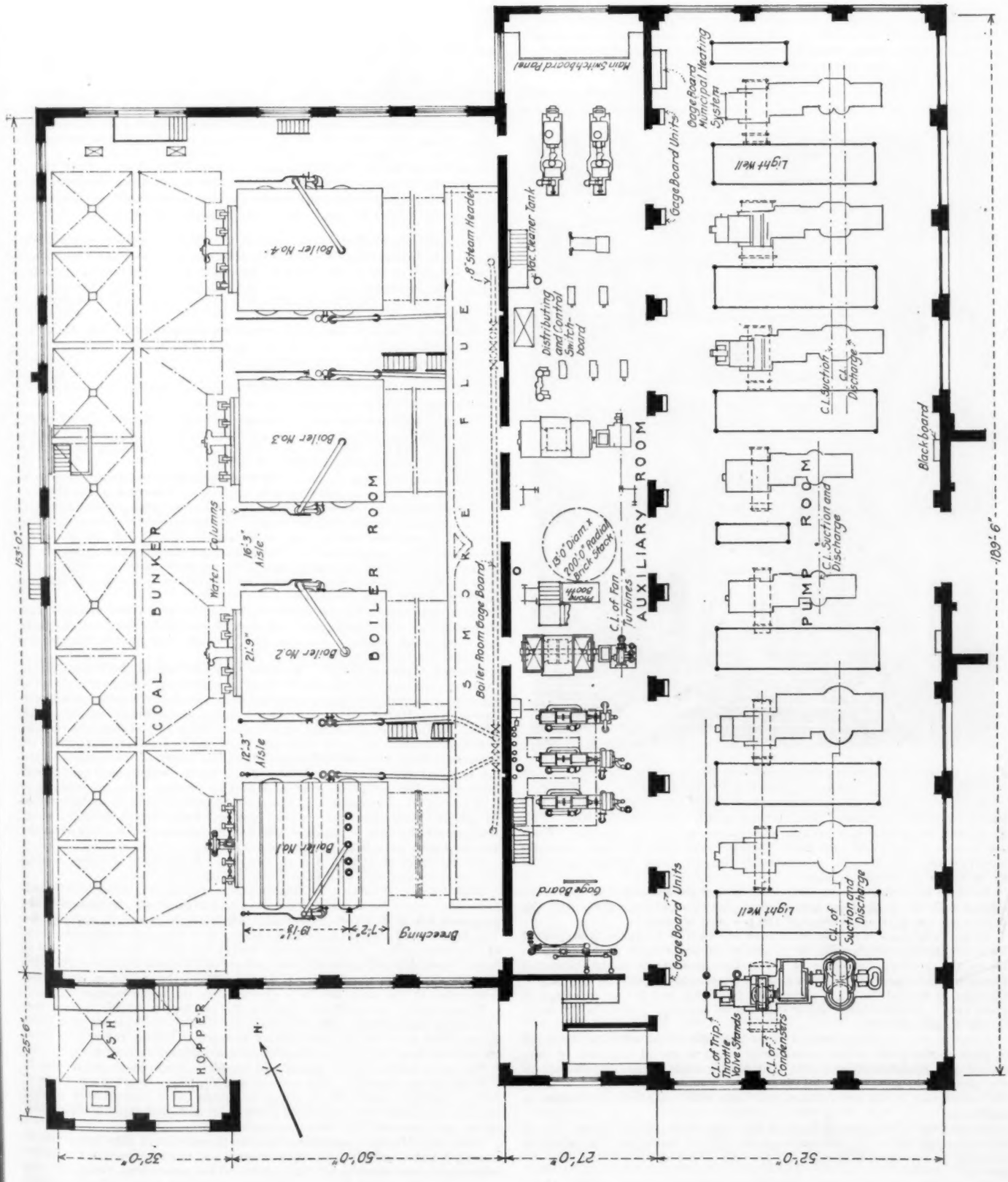

FIG. 3 PLAN OF THE FAIRMOUNT PUMPING STATION AND HEATING PLANT, CLEVELAND, OHIO

FIG. 2 CROSS-SECTION OF THE FAIRMOUNT PUMPING STATION AND

clinker-grinder gear box is driven from a chain and sprocket on an extension from the stoker driveshaft.

The Fairmount Station stokers are 10-retort Riley underfeed, equipped with single-roll clinker grinders and high side tuyeres. A year's service at Division Station with a stoker equipped with high side tuyeres showed a material reduction in sidewall maintenance costs compared with the lower type. The rate of coal supply to each half of the stoker can be varied by the two-speed gear box. The deep pit provided above the clinker grinder allows ample time for refuse to cool before discharge through the grinder. The rocker-plate apron forms one wall of the grinder pit and its continuous motion prevents the refuse from arching over the clinker grinder. The lower plates against which the ash is ground are stationary.

Ash Hoppers. The ashes discharged by the clinker grinder drop into Baker-Dunbar ash hoppers of the sectional cast-iron plate type with tile

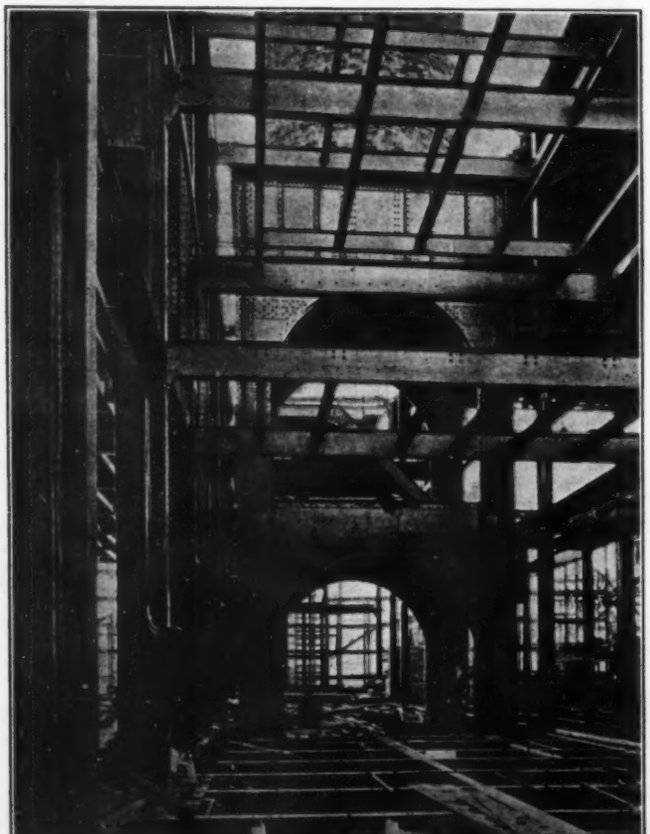

FIG. 4 STRUCTURAL-STEEL PLATFORM FOR SUPPORTING STACK 13 FT. IN DIAMETER AND 200 FT. HIGH

lining made of hard-burned flint firebrick which overlap each other. This lining will resist alternate heating and quenching without spalling. Each ash hopper is equipped with three "Arrow" type gates of heavy cast-iron construction, with integral mechanically cleaned water troughs, operated by a single hydraulic cylinder.

As these hoppers have an active ash-storage capacity of 350 cu. ft., no laborer will be required for ash removal in two eight-hour shifts with the boilers operating at an average of 150 per cent of rating.

Stack. The stack, which is 200 ft. high and 13 ft. in diameter, is supported on a structural-steel platform 43 ft. above the boiler-room floor and 55 ft. above the footings. See Fig. 4. The flue gases have an unobstructed flow into the bottom of the stack and the friction loss should be very slight. One square foot of the stack serves 30.1 boiler hp. and 5.7 sq. ft. of active grate area. A radial-brick lining with a 2-in. air space is built in the stack to the height of 40 ft.

Economizers. Looking forward to the time when coal will have increased in price to the point where economizers of an approved type can be purchased and maintained at a cost that will warrant their installation in the plant, the boiler room and its equipment have been designed to allow the installation of the economizers and fans with only minor charges at such time.

Forced-Draft Equipment. Each of the two forced-draft blowers has a capacity of 82,000 cu. ft. per min. against 6 in. of water pressure, which is sufficient to run three boilers at 225 per cent of rating with 60 per cent excess air.

The blowers are the Buffalo-Forge Conoidal type and are driven by DeLaval non-condensing geared turbines. These blowers are located in the auxiliary room, as shown in Fig. 2, and take air from the preheater section of the main smoke flue.

Water Softening. Since none of the condensate from the steam supplied to the municipal heating system mains is returned to the Station, the feedwater make-up will at times amount to over 100,000 lb. per hr. Lake Erie water has slightly less than eight grains of hardness per gallon and can be softened to zero hardness by the use of zeolite at a cost of regenerating of approximately $0.50 per 100,000 lb. The equipment selected is made by the Wayne Tank and Pump Company and has a capacity of 320,000 gal. in 24 hr. The regenerating units are in duplicate and a salt storage tank on an upper floor holds sufficient salt for 20 days' regeneration under average operation.

Feedwater Heating. The feedwater heater is of the open type of cast-iron sectional construction, made in twin units and of Cookson design. Two make-up valves controlled by floats are used, one small one for summer operation and one larger one for winter operation. The heater trays are made of cast iron and are readily accessible. The steam vented from the heater to keep it from getting airbound passes through a Riley heater on its way to the stack. A small portion of the feedwater passes through the Riley heater and condenses the steam that is vented, thus recovering most of its heat. A pressure varying from atmospheric to 10 lb. gage is maintained in the heater, depending on the season of the year. Both the exhaust from the steam-driven auxiliaries and the low-pressure bleeder turbines are discharged into a common header leading to the feedwater heater, and the pressure in this system is regulated by diaphragm control of the bleeder turbines.

High-pressure bleeder steam is not only available for the municipal heating system, but can also be used for heating the feedwater in a closed heater after it has been heated by the open heater to a temperature of 210 to 220 deg. The feedwater can be raised in the closed heater to temperatures exceeding 300 deg. by this method, with an increasing overall plant economy of approximately 5 per cent.

Feedwater Pumps. The three feedwater pumps are of the Rees Ro-Turbo design and made up of units consisting of two four-stage split-case pumps connected in series with the turbine drives and designed for 365 lb. working pressure. Two of the units are driven by Kerr steam turbines and one by a Rees Ro-Turbo hydraulic turbine taking its water from a connection to the second-high-service system.

The hydraulic turbine used is a standard four-stage centrifugal pump taking second-high-service water at a pressure of 478 ft., piped to the suction connection, and the discharge connection is piped to discharge into Baldwin Reservoir, giving a back pressure of 78 ft.

Electric Lighting and Power. The electric lighting and power system for the Fairmount-Baldwin project will be supplied with current by two 200-kw., 2300-volt, 80 per cent power factor, 3-phase, 60-cycle turbo-generators located in the pumping-station auxiliary room. The guaranteed steam consumption of the Kerr turbines driving these small units is 32½ lb. per kw-hr. at full load, with 2 lb. back pressure. Distribution of power to the various buildings will be by means of underground 2300-volt feeders from the main switchboard. Each building will be served by two cables, one normally carrying lighting service and the other power service.

Air Compressor. Air for operation of air tools, turbine cleaners, etc., is supplied by a 3-cylinder, vertical, motor-operated Westinghouse Airbrake Co. compressor having a capacity of 176 cu. ft. free air per minute, and arranged for automatic control.

Vacuum Cleaning System. In order that the tops of the boilers, smoke flue and other parts of the station may be kept clean with as little labor as possible, a vacuum cleaning system has been installed, consisting of a motor-driven Nash-Hytor pump with a water-spray dust-removal system. This pump handles 80 cu. ft. of free air per minute with 9 in. of mercury vacuum.

Oiling System. All main units and most of the auxiliary equipment are lubricated from a central oiling system. The larger of the pumping units are supplied with oil at the rate of 50 gal. per min., which takes care of both lubrication and reduction gear and bearing cooling. An oil pressure of 5 lb. per sq. in. is maintained at the shaft centers of the units and is supplied by gravity from either one or two 1200-gal. tanks in the auxiliary room. An automatic alarm is provided which rings whenever the oil level in the supply tanks gets 9 in. lower than normal.

Oil velocities of 2½ to 3½ ft. per sec. are used for the lines feeding the turbines and 1½ to 2 ft. per sec. for the drain lines.

High-Pressure Piping. All high-pressure piping, including flanges, dimensions, raised faces, length of valves and fittings, etc., conforms to the proposed A.S.M.E. 400-lb. Standard. All joints on pipe 3 in. and over are Van Stone. All high-pressure gate valves are of cast steel with monel trim, of Chapman make. The non-return valves and globe valves are of cast or forged steel, depending on the size, and are of Edwards manufacture. Trip throttle valves are the Schutte-Koerting make. One valve on each boiler connection at the main header is operated by the Dean control unit.

When there is not sufficient load on the turbines to obtain the required amount of high-pressure bleeder steam for the heating system, it is taken direct from the high-pressure header through a Borsig valve with Dean control equipped with an automatic pressure-regulating device.

The main piping in the pump and auxiliary rooms is shown in Fig. 2.

Main Pump Headers. The suction and discharge headers are made of flanged cast-iron pipe. Each pump discharge has a venturi tube located beyond the check valve, and both the suction and discharge valves on each pump are operated by Dean controls.

Gages and Meters. Approximately one hundred and fifty indicating or recording gages, meters, and thermometers are required to give the proper indications and records for this plant. The steam-flow meters for the heating line are of the General Electric mechanical type. The boiler-feed meters are of the Builders' Iron Foundry make. The indicating and recording gages are of the Foxboro make. All pump-room meters and gages are designed for flush mounting on gage boards. Both indicating and recording gages have micrometer pen-arm adjustment. All recording gages and meter charts are driven by Warren electric clocks.

Design, Manufacture, and Production Control of a Standard Machine

By RALPH E. FLANDERS,[1] SPRINGFIELD, VT.

This paper describes the methods by which difficulties in manufacture and production control were avoided by the Jones and Lamson Machine Company. The company having passed through a period of increasing speeds and feeds, and improvements in methods of doing work and controlling it with satisfactory results as to total machinery time and direct labor cost, directed its attention to overhead which had suffered a considerable increase due to foremen, clerical work, and cost and production offices necessary for methods which had been adopted.

Reorganization commenced with a segregation of the products in manufacture so that separate manufacturing organizations and equipments were provided for each product. A redesign of the product was then undertaken to eliminate as many parts as possible and to standardize parts to fit several types of machines. The shop was arranged on a basis of departments by products. The author describes the turret-lathe shop, the chief manufacturing processes involved, and the routing and stock-room control.

The principles sought to be established in this work were: Standardization of product; a separate manufacturing equipment and organization for the product; departmentalization by product rather by process; a recurrent production schedule; concentration of plant; minimized transportation; disturbing and difficult factors confined to purchasing; visual control of work itself instead of remote control by records; control by orders instead of by records; automatic control of inventories; cost figuring by analyzing total rather than by totaling innumerable details; a plain job for every man and full responsibility with it.

A LITTLE over twelve years ago the author became connected with the Jones & Lamson Machine Company. About that time—or a little earlier—the management of the company began an intensive campaign for the increase of speeds and feeds, improvement in methods of doing work and controlling it, and development of all the other lines of progress which in general come under the head of "scientific management." This work was guided at time by members of the company's own force, and at times by an outside organization of specialists.

The net result of this several years of effort was decidedly profitable. Speeds and feeds were greatly increased, and the total machining time and total direct labor cost of the product noticeably reduced—and this in the face of considerably increased earnings to the men. All of this is, of course, the expected result of successful work of this kind.

About four or five years ago, however, we lost the first keenness of our interest in direct labor cost and became concerned with the "overhead." With only a moderate increase in output, there had been a considerable increase in the number of foremen—functional and otherwise—and a great increase in the amount of clerical work they were called on to do. In fact, it had become necessary to provide many of them with clerks.

There was also a violent increase in the personnel of the cost and production offices. The attempt to control the whole organization from a central point led also to a flood of written orders and reports, which was evidenced by the multitude, variety, and size of our printing bills.

It was possible, at any time and at any point in the shop, to make a rough estimate as to the percentage of the men in sight who were at that moment actually engaged in the processes of profitable manufacture, and to find that percentage quite unsatisfactory.[2]

Finally, the general statistics of the plant showed that the direct labor cost of the product was very small—as had been hoped; it showed the material cost as much higher; but the manufacturing overhead was largest of all—so large that with a moderate selling expense the percentage of profit was somewhat precarious. The percentages were, in fact, such that if the item of direct labor cost had been completely eliminated, there still would not have been any extraordinary profits at the selling prices prevailing.

We are not the only manufacturers, or the first, who have made this interesting discovery. But whenever and wherever made, this discovery is a matter of the highest importance, and should lead to a radically changed treatment of the problem of management.

It was evident that in our case progress toward efficiency in direct labor cost had reached the point where the "law of diminishing returns" became effective, and further effort in that direction would be unprofitable. We therefore transferred our attention to the other elements of cost, and particularly to the largest of them—the manufacturing overhead.

The overhead cost had not grown to its preponderant dimensions suddenly or through carelessness. It was the result of slow

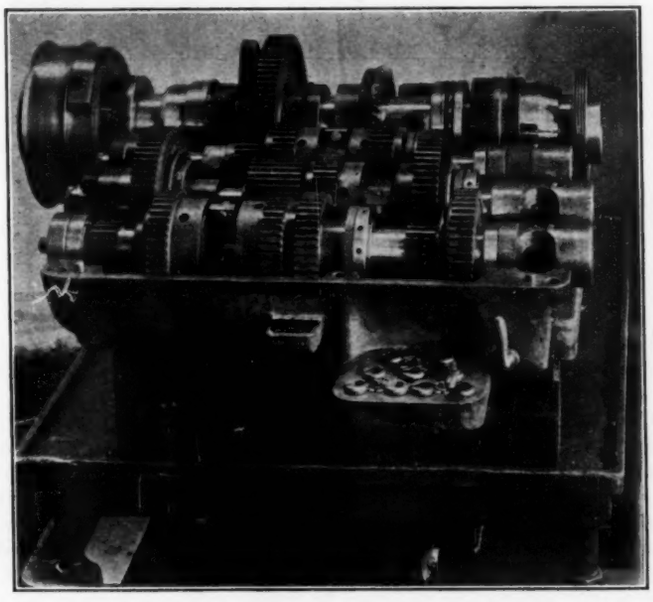

FIG. 1 HEADSTOCK OF 3-IN. FLAT TURRET LATHE

accretions of small expenses, each added to take care of some real difficulty in management in what looked, at the time, like the simplest and least expensive way. An examination of the various details did not indicate that they could be successfully improved by individual treatment. A major operation seemed to be "indicated," as the doctors say.

To put it briefly, the major operation decided on consisted in rearranging all the elements of the business so that difficulties were *avoided* rather than *overcome*. These radical changes are detailed in the following paragraphs.

SEGREGATING PRODUCTS IN MANUFACTURE

The oldest and principal product of the company is the Hartness flat-turret lathe. Other important products are the Fay automatic lathe and the Hartness automatic opening die. A beginning in segregation had been made some years before in developing the automatic die into a separate business, with its own manufacturing organization and equipment. The Fay automatic was first assembled in a department of its own; it was now in turn provided with a practically complete equipment for making all its parts and given separate quarters.

In the turret-lathe division the work was of two kinds—the manu-

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[1] Manager, Jones & Lamson Machine Co. Mem. A.S.M.E.

[2] This visual estimate, it may be said, is quite useful and revealing practice, and every shop manager who has not acquainted the habit should contract it at once. It should be made with a view to criticizing the management rather than the workers.

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facture of new machines, and a rather large service business in the supply of replacement parts for the machines (numbering some 15,000) now in the users' hands. Many of these parts were obsolete, being for machines of a design established in 1893. The others were of the then current design, established in 1905.

The final, and significant, act of segregation consisted in separating the service department completely from the turret-lathe production and putting it with all other special work into a division of its own. Here it was united with the manufacture of regular

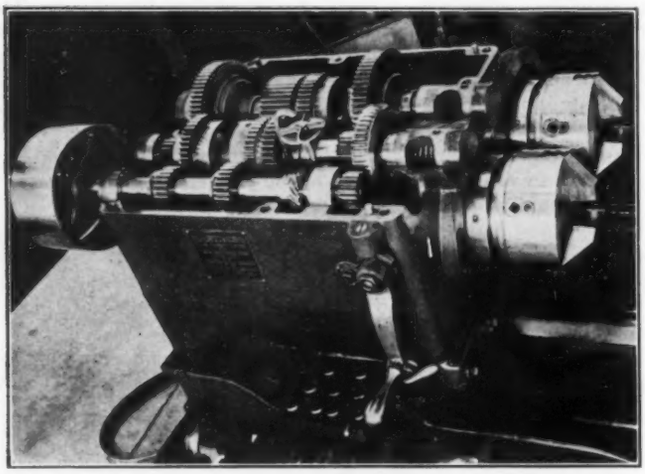

FIG. 2 HEADSTOCK OF DOUBLE-SPINDLE FLAT-TURRET LATHE

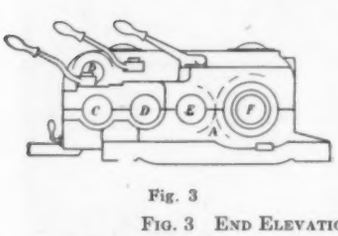

Fig. 3

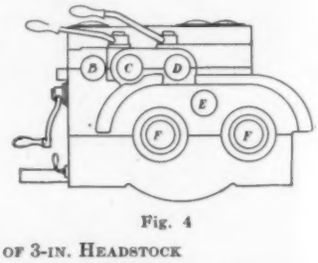

Fig. 4

FIG. 3 END ELEVATION OF 3-IN. HEADSTOCK

FIG. 4 END ELEVATION OF DOUBLE-SPINDLE HEADSTOCK

and special equipment for our customers, and the building of tools, fixtures, and special machines for ourselves.

Thus everything irregular, spasmodic, and unpredictable was assigned to this special department, while steady machine production, on a more easily predetermined program, was concentrated in the section devoted to machine building. By working toward regularity and routine we hoped to reach conditions under which a considerable element of the overhead expense would become unnecessary.

Meanwhile there was another element conducing to irregularity which had to be taken care of. While the department could be run under general orders to produce a given number of machines per week, there could be no foreknowledge far in advance as to how many of them should be "$2^1/_4$-in. machines," how many of them "3-in. machines" and how many of them "double spindles"—these being the shop terms for the three styles in which the turret lathe was built. These machines were designed on the same general plan, and many of the parts in the $2^1/_4$-in. and 3-in. machines interchanged, but this was not true to any extent of the double-spindle turret lathe.

A redesign of these three types was therefore undertaken to make them as nearly alike as possible, not only in their separate individual parts but also in their unit assemblies. This redesign was so successful that we are now able to assemble three basic sizes (or, with varying equipment, seven types in all) from the same parts with the following variety of major castings: 2 headstocks, 2 spindles, 2 beds, 2 turret slides, 3 turrets, and a few minor parts.

Figs. 1 and 2 show respectively the 3-in. and double-spindle headstocks. In the elevations, Figs. 3 and 4, the same shafts are marked by corresponding letters. These shafts, with their complete assemblies of gears, clutches, ball bearings, etc., as well as the spindles and their gears and boxes, can be interchanged in either headstock. Except for one or two minor points the man who assembles one of these shafts need not know into what style of machine it is going.

For a $2^1/_4$-in. headstock, with its higher spindle speed, the driving-gear ratio at *A* in Fig. 3 is altered, and a spindle with a different nose used. About the only criticism which could be directed against this redesign relates to using the powerful 3-in. drive on this $2^1/_4$-in. machine. It is much more powerful than is needed. *But it is cheaper to make it alike and heavier, than lighter and different.*

Besides bringing the design of the machines together, the variety of parts in a given machine was greatly reduced. For instance, the design of the friction clutches on the different shafts was made the same. These are of the multiple-disk type. On the fast-running shafts with light torque, thicker and fewer hardened disks

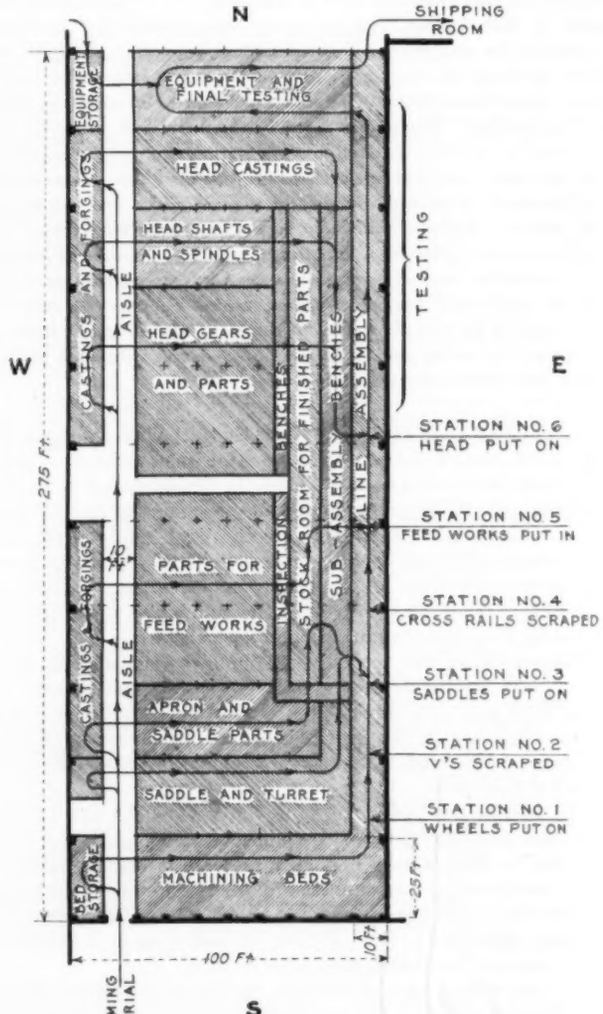

FIG. 5 GENERAL ARRANGEMENT OF TURRET-LATHE SHOP

are used. On the slow-moving shafts with heavy torque, more and thinner ones are employed. All of this work practically cut in half the total number of kinds of parts to be dealt with in making the full line.

The three basic sizes of machine having thus been unified in design, they became for all practical purposes one machine. The workmen scarcely know which size they are working on. They may be put through the assembly in groups of fifteen or twenty each, or mixed together indiscriminately, without making a break in the routine of manufacture.

This unification of the product was in reality a return, in a more developed way, to the first principles followed by Mr. Hartness who confined the work of the shop from 1892 to 1905 to one machine and one size of machine. It is needless to say that now, as

then, the range of the machines built was carefully determined to cover the largest practicable percentage of the lathe work of the world, in order to give the broadest possible market for our intentionally restricted line.

SHOP ARRANGEMENT

We now come to the most interesting physical feature of the problem—the arrangement of the shop.

There are two methods of arranging departments—by process and by product. By the former plan all milling is done in a milling department, all drilling in a drilling department, all turning in a lathe department, etc. The argument for this is that by specializing on a given operation the foreman and his assistants become highly skilled in that work, doing it better and more cheaply than if they were concerned with a wide range of operations. The disadvantages lie chiefly in the constant movement of work from department to department, with its consequent slowing up of the work flow, division of responsibility, and difficulty of control.

Arranging the departments by product means that any individual piece stays in a single department until it is completely finished, ready for assembly. Such a department may be arranged to complete all parts of a similar nature, no matter where found in the machine, or all parts of whatever nature belonging to a given assembly unit of the machine. Both arrangements are to be found in automobile manufacture, where departmentalization by product is the rule in the larger and more successful shops.

In this turret-lathe shop it was decided to departmentalize by product, primarily on the basis of the unit assembly, and only secondarily by similarity of parts. This arrangement was expected to prove strongest where the method by process was weakest; and its single disadvantage, lack of specialization by the foreman, was believed (and later found) to be largely illusory.

The space available was 275 ft. long by 100 ft. wide, divided by columns lengthwise, as shown in Fig. 5, into 10-ft. aisles, and crosswise into 25-ft. bays. Experience with this shop leads us to believe that about this width of shop and width of cross-bays are ideal for medium-sized manufacture. The columns should, however, be spaced to give 20-ft. aisles, as has been done in our later construction. The later buildings are also increased in width to 120 ft. Such shops may be built to any length required by the magnitude of the production. The building referred to is of steel-frame, sawtooth-roof construction and fireproof.

The general arrangement is indicated in Fig. 5. The incoming material passes north up a long aisle extending the full length of the shop. In the aisle on the left, next to the west wall, are the bins in which the raw material is stored. The center of the shop is occupied by the various manufacturing departments, after which comes the equipment and final testing of the machines.

In successive aisles toward the east, and running for practically the full length of the manufacturing section, come the inspection benches, storage of finished parts, sub-assemblies and line assembly. From the line assembly the finished machines detour into the bay for equipment and final testing, and out into the painting and shipping room.

The flow of material is thus from the southwest corner north to the appropriate department, thence directly east across the width of the shop to final inspection and storage, thence to sub-assembly and line assembly. The line assembly moves north on the eastern side and out at the northeast.

Let us follow the progress of the bed. The arrangement of the machines for its department is shown in Fig. 6. The castings are stored at the west of the aisle. From there they are taken first to an Ingersoll mill, where the pads on the bottom are milled off, after which the bed is turned over and the cross-rails milled. Space for a second mill is left as shown by the dotted lines in Fig. 6. The bed now goes to the roughing planer, and thence to the horizontal boring and milling machine. The next location is the radial drill. Here the bed is held by the V's or special fixtures, and light sectional jigs are used for the drilling.

The machining is now nearly completed, and the bed rests for a time on the floor. It then goes to the finishing planer to scrape the V's. This is a final machining to remove all "wind" so that the hand scraper's job shall be one of finishing the surface rather than of removing material. The bed is now mounted on wheels instead of its regular legs, and is ready to start up the assembly line—of which more later.

The important things to observe are the permanently mounted fixtures (adjustable for the two styles of bed), the simplicity of the operations, and the unvarying routine of the procedure. The department is under the foreman of the line assembly, but as a matter of fact it is practically self-managing.

The "saddles" (turret slides) and turrets, machined in the next department, are also large pieces. The layout is shown in Fig. 7. When completed these parts shift north to the appropriate point in the sub-assembly aisle.

The apron and turret-slide parts in general comprise main castings, gears, shafts and studs, and milled steel parts. The layout for this department, Fig. 8, shows three lines of tools. The upper or northern line, comprising mills, driller, etc., takes care of the castings and milled steel parts. The lower or southern line, composed of turret lathes, machines the shaft, studs, and gears which, however, pass north at the end through the Fellows gear shaper and the Bryant internal grinder on their way to the inspection bench and the parts storage. The central line is composed of miscellaneous machines common to the other two.

This arrangement exemplifies the subdivision of the departments on the basis of the character of the parts machined. A similar case is shown in Fig. 7, where the turrets go east along the south side, and the turret slides east along the north side. In this way the flow of every part can be made to approximate a straightforward progress from west to east, with only occasional and minor divagations. This makes for ease of control and orderliness in the department.

The layout of the department for machining feed-works parts is as shown in Fig. 9. Here again we have separate lines of machines for different classes of work, as indicated on the layout. From the machines the work is handed over to the inspection bench and thence to the stock room. From there it goes to the sub-assembly and line assembly.

The head-gear department is laid out as shown in Fig. 10, and the shaft and spindle department as in Fig. 11. A pair of Fay automatic lathes are kept set up with an adjustable, but standard, equipment for the shafts. The succeeding spline millers, drills, and grinders are plainly indicated.

The head-castings department is interesting for its specialized equipment. The bases are planed on the bottom, then caps and bases are milled for the joint. After drilling together, the united headstock goes to a special boring machine, when all the shaft and spindle holes are rough and finish bored, reamed, faced, and tapped at one setting. The machine for this work costs much less than a standard boring machine and jig for the same purpose, and finishes all the holes at once instead of one at a time. This is an example of the economies possible in continuous production.

The head then goes to the radial drill, etc. for finishing operations, and thence to the sub-assembly, on a trolley beam around the north end of the finished-parts storage.

Let us now return to the assembly line, following the order shown in Fig. 5. The different operations are so divided as to give about equal lengths to each.

At the first station the wheels are put on. At station 2 the V's are scraped. At station 3 the turret slide is put on, scraped to the V's, and the turret rescraped to the slide. At station 4 the cross-rails for the cross-sliding head are scraped, using special devices to bring them at right angles with and parallel to the V's.

At station 5 the oil pump and piping and the feed work are put in. Next the headstock is placed on the machine, and it is now complete. There are still, however, five stations remaining before reaching the department for equipment and final testing. Advantage is taken of this space to give the machines a final "run-in," which is done by belting them to motors overhead.

This running-in is opposite to the head assembly and is under the care of that group. Any difficulties or needed adjustments are taken care of here.

There is nothing special to be said about the department for equipment and final testing. The machines are mounted on their legs here, equipped with motors if required, and then with regular or special equipment as may have been ordered. Finally they are put through standard alignment and operative tests.

There are certain departments and operations not included in

this layout. Steel storage and cutting-off are taken care of in one department for the whole plant. So are casting, snagging, cleaning, and filling. These come before the parts arrive in the turret-lathe shop. After the machines leave the equipment and testing department they go to a painting, boxing, and shipping room common to all of the products.

Automatic-screw-machine products are taken care of in one department for the whole shop; and so, finally, is the hardening and heat treating. This latter operation is the only one making a break in the orderly flow of work through the shop.

Routing and Stock-Room Control

The orders for parts are routed through this shop in a predetermined and effective course, but without any machinery of control. The rough- and finished-parts stock rooms are kept supplied with an adequate store of parts to prevent any hold-up in production, but there is no stockkeeper assigned to them; nor does this lack of special supervision result in unbalanced or undesirably large inventories or in unexpected shortages. These desirable features are

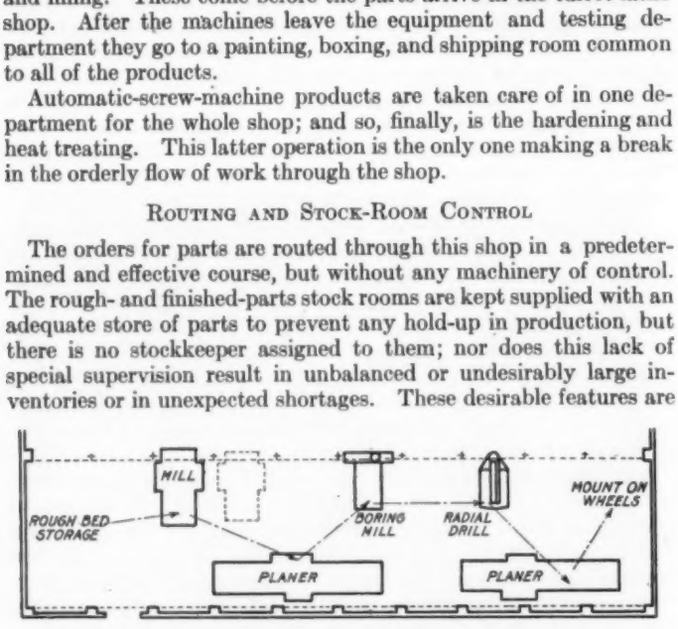

FIG. 6 LAYOUT OF DEPARTMENT FOR BED MACHINERY

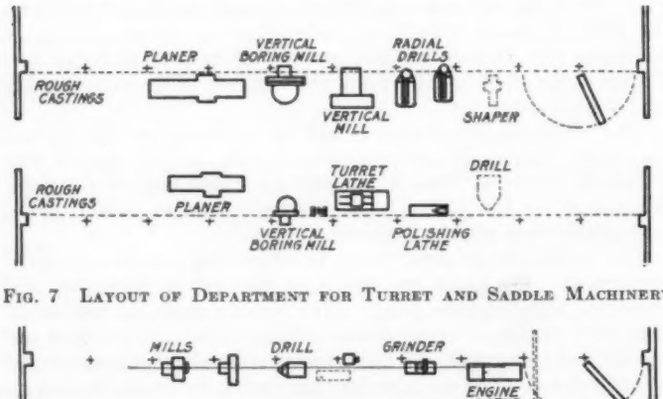

FIG. 7 LAYOUT OF DEPARTMENT FOR TURRET AND SADDLE MACHINERY

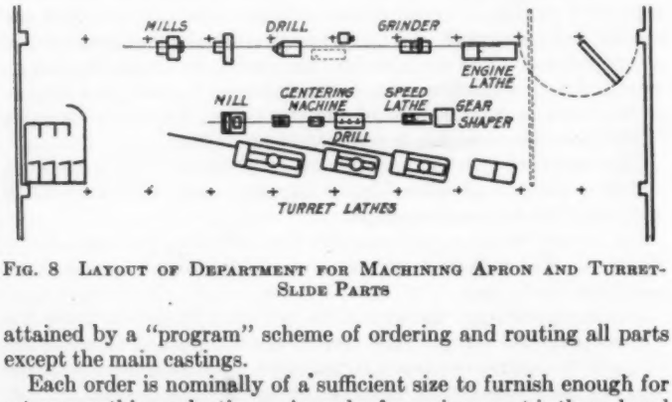

FIG. 8 LAYOUT OF DEPARTMENT FOR MACHINING APRON AND TURRET-SLIDE PARTS

attained by a "program" scheme of ordering and routing all parts except the main castings.

Each order is nominally of a sufficient size to furnish enough for a two-month's production. An order for a given part is thus placed in the shop every two months, or six times a year. The second period of the year (March and April) is an exact duplicate of January and February. A standard routing of all the parts passing through a given department may thus be laid out, from machine to machine, and duplicated for the next period and the next, and so on for the six periods of the year.

The routing was originally laid out on the basis of full production of five machines per day, on special sheets provided for this work. Fig. 12 shows sample pages from this routing book.

This standard routing is made upon the basis of our previous years of experience in speeds and feeds, and is arranged to put the orders through in the minimum time, with sufficient waits between operations to insure against trouble. All long waits, however, are eliminated, and with them the expensive items of storage space and idle capital for inactive stock. The ideal aimed at has been that of a small, fast-flowing stream of work instead of a large, sluggish one. Further insurance against trouble is offered by reckoning on only about 80 per cent of the theoretical machine capacity. The margin takes care of breakdowns, breaking in new operators, poor stock, etc. There is the additional possibility of running overtime in an emergency.

The original laying out of the schedule is a matter of juggling, judgment, and experience. A successful solution implies a minimum of equipment, a minimum of floor area, a minimum inventory of work in process, a maximum rate of progress of the work, and

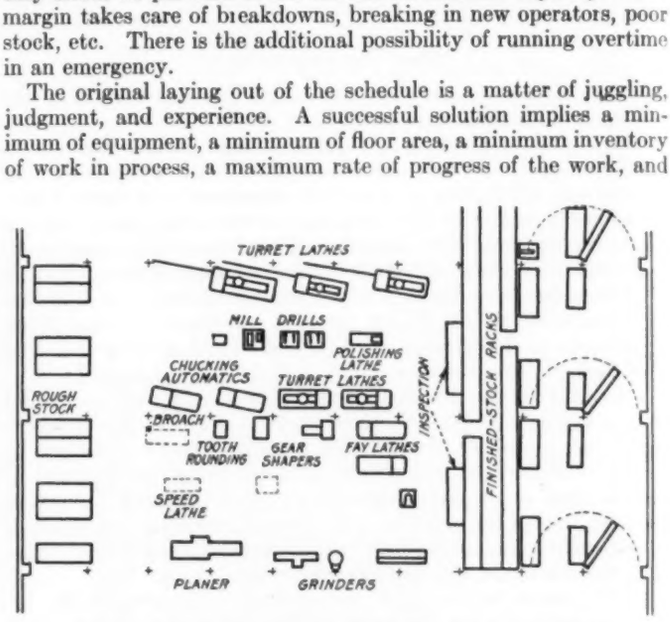

FIG. 9 LAYOUT OF DEPARTMENT FOR MACHINING FEED-WORKS PARTS

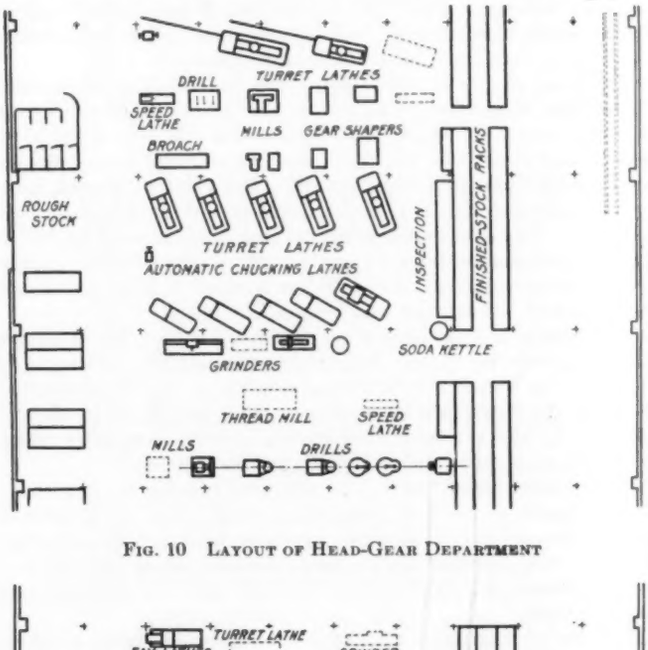

FIG. 10 LAYOUT OF HEAD-GEAR DEPARTMENT

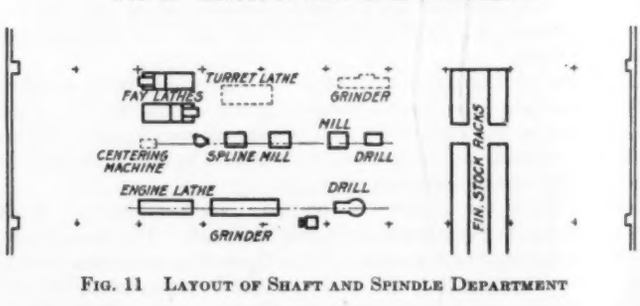

FIG. 11 LAYOUT OF SHAFT AND SPINDLE DEPARTMENT

a simple and easily comprehended standard of achievement for the department.

The finished routing schedule gives a starting date, repeated every two months, for each part. These starting dates, with other data, are recorded on a card shown in Fig. 13. If castings or forgings are required, the date on which they are to be ordered is also given, and on that date the foreman is held reponsible for making a requisition on the purchasing department.

Note that a wide range of rates of production is provided for—from 3 to 30 per week. The rate of production is determined by

the general management, and the shop takes its information from the corresponding line on the card.

Now there is supposed to be carried in the rough-stock bins a full half-lot of castings or forgings in reserve. The first step of the foreman is to count this reserve stock. If it is below normal for the scheduled production, he adds to the normal order enough to make up the deficit. If it is above normal, he decreases his normal order by this amount.

This half-lot in reserve is insurance against trouble. It takes care of poor castings, delayed deliveries, spoiled work, etc. It is particularly important from the standpoint of starting the orders on time. If only half of a lot has arrived, it is still possible to put the work into the shop by drawing on this reserve. The *sine qua non* of this method of production control is starting on time. Nervous tension, frantic struggling, and despairing clutching at straws must be eliminated from the production schedule and concentrated on the problem of getting started on time.

The amount of rough stock ordered is thus determined by the scheduled rate of production and an actual count of the reserve supply. The finished-stock room is run on the same principle. When a new lot arrives in the stock room it is supposed to find a half-lot in reserve waiting there. At the earlier period of starting the lot there should be a correspondingly larger amount, and this amount is set down on the card. If the reserve stock is low, the foreman increases the normal lot to make up the deficit. If it is in excess, he correspondingly decreases his order.

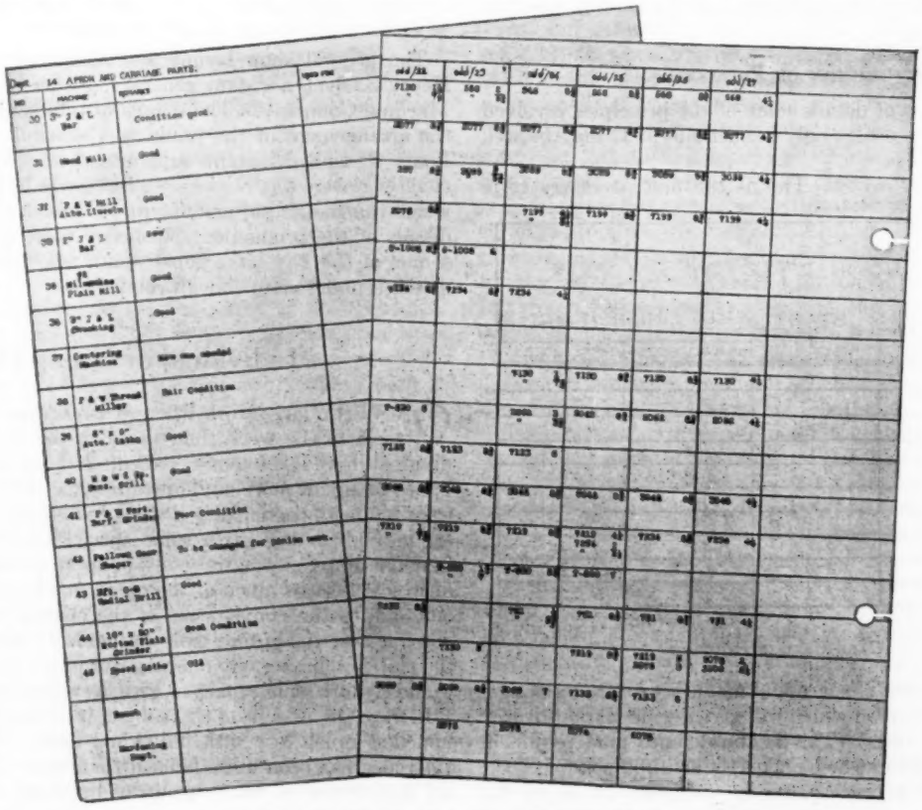

FIG. 12 SAMPLE PAGE FROM ROUTING BOOK

There are no stock-room records. Both rough stock and finished stock get a complete count six times a year, and a better knowledge is obtained than is possible with all the chances for error in the clerical work of the perpetual inventory.

The stock is under continuous control. Orders go out from the main office to work on a production basis of 30 or 75 machines a month, or whatever it may be, and automatically the stock adjusts itself to this production. Change in scale of production is made easy by the provision of a reserve of half a lot in both rough stock and finished parts. The scheduled production on the card of Fig. 12 may be increased a step a month, or decreased at the same rate. If the proper changes in labor capacity are made to correspond, the adjustment of size of lots and size of stock takes place easily with the half-lot reserve as a balance wheel.

This is startingly different from the old order of things with us, in which shortened production left us with a large stock, and increased production with an insufficient one. There is the accompanying financial advantage that the amount tied up in rough stock, work in process, and finished parts is automatically adjusted to the scale of production. It leaves for special decision only the major financial problem of how much shall be tied up in finished machines.

As there are no stock records there is no stockkeeper. The foreman of each department oversees the putting into and taking out of the rough stock. The inspector, located beside the stock room, O. K.'s the finished work and places it in the proper bins. The bins are located opposite the point where the parts are finished and close to the point where they are assembled. One of the assembly men, detailed for the purpose, steps in and lays a group of parts on the top of the rack opposite the man who needs them when he needs them. It is possible to look down the aisle of the stock room twenty times and see a man in it only once.

THE DUTIES OF THE FOREMAN

This scheme of management is essentially a decentralized one. By keeping the work completely within the department from rough stock to finished stock, we avoid the necessity for detailed control of its movements, particularly with reference to interdepartmental relations. These are minimized, relating almost entirely to hardening operations. Roaming about the shop becomes unnecessary, the telephone falls into disuse, clerks disappear, and a hundred chances for confusion are dissolved.

The foreman is bounded only by his production orders and his schedule. Within these limits he is king of his territory, with full power given to him—and full responsibility demanded of him. His job is his own in a way that is never possible under the other plan of departmentalization and other schemes of management.

Mention was made of the fact that only about 80 per cent of full production per machine was reckoned with in laying out the schedule. This will ordinarily leave some idle time. When such idle time appears imminent on a machine, the foreman goes shopping for work in the special or other departments. The service parts furnish convenient "knitting work." Since it is difficult to predict the call for repair parts, this branch of the business is handled in the old-fashioned way. The foreman can usually pick up something here to fill in his idle time.

He is provided, finally, with a definite yardstick with which to measure the efficiency of his department. The schedule requires a certain total number of hours for a given rate of output. If he requires more, he is not up to standard. If less, his management may be highly commended. In general, he will have to stick very closely to the definite routing prescribed by the schedule to maintain full production. On lessened production, with fewer men but a full complement of equipment, more latitude is allowed.

COST ACCOUNTING

There is little need for detail cost accounting. The cost of the machines can be determined sufficiently for price-setting purposes by reckoning on the overall operations of the shop—so much spent for steel, castings, forgings, etc. per month, so much for labor, and so much for overhead and fixed charges. This, divided by the output, gives a good cost per machine, *because the department is run on an even basis.* This simplified method of cost keeping is not the least of the advantages of this method of management; and the author believes it to be far more accurate—as well as far

less expensive—that the elaborate addition of the labor, material, and overhead for every one of the several hundred separate parts.

It should also be noted that the standard schedule presupposes standard costs with a given average labor rate and market cost of material. This standard cost derived from the standard schedule, set against the actual cost obtained as above, gives another gage of achievement.

Methods of Wage Payment

We are now working on a straight hourly-rate basis. The effectiveness of workmen and foremen can in general be gaged by their ability to keep to schedule, and their rate of pay can be adjusted accordingly. The plan would, however, seem to be adaptable to premium payment, and perhaps still more so to piece-work or bonus payment. It would seem to be especially suited to the group-bonus scheme, as the whole organization is divided up into small groups, each of which has a definite section of the work assigned to it and within its control.

Recapitulation of Principles

In the foregoing mass of details some of the principles involved are brought out clearly, others only incidentally. It may be well to recapitulate then here.

1 *Standardization of Product.* This is the first necessary step.

LIST NO. 7233 NO IN 2IN 2 3IN 2 2SP 0

ORDER STOCK 1 old START 10 even FINISH 28 even

MACHINES PER WEEK	NORMAL ROUGH STOCK	NORMAL FINISHED PARTS	NORMAL ORDER	TOTAL HOURS
3	10	16	20	68
4	14	22	28	92
5	18	28	36	116
7	24	38	48	152
9	32	51	64	200
12	40	64	80	248
15	52	82	104	320
19	66	105	132	404
24	84	134	168	512
30	104	166	208	632

Fig. 13 Card Used in Routing

It is the prime requirement of successful manufacture that a design of the product be settled upon which will give a wide market over a considerable period of years. This is the definite predetermined simplification of the problem which makes the solution possible.

2 *A Separate Manufacturing Equipment and Organization for the Product.*

3 *Departmentalization by Product Rather Than by Process.* There is nothing new in this. It is the plan of the high-production automobile shop. The novelty lies in adapting it to a low scale of production—in our case to an extreme low point of fifteen per month.

4 *A Recurrent Production Schedule or Program.* It is this feature which permits the adaptation to small production, and also makes possible the measurement of efficiency and the simplification in control and cost accounting.

5 *Concentration of Plant.* Principles 3 and 4 can operate to cut down machine and building investment for a given production, or to increase production for a given investment. It is worth while to decrease "the great open spaces" in a shop, if only to keep the work from taking root and going to seed in them.

6 *Minimized Transportation.*

7 *Disturbing and Difficult Factors Confined to Purchasing.* So far as possible, strenuous effort is made to have material ready to start on time. Then confusion is banished from the shop.

8 *Visual Control of the Work Itself, Instead of Remote Control by Records.* It is less than one hundred feet from raw material to finished machine. Within this short distance the work is to be found (except while being heat treated). It cannot escape. The foreman has it under his eye until it is assembled and rolls into the shipping room. In control by records some superexecutive functionary sits at a desk and pores over cards and slips of paper. A few hours of this and the eyes glaze and the judgment falters. It is better to deal with things rather than with the records of things.

9 *Control by Orders Instead of by Records.* Records are always late. Direct the thing before it happens and save some tons of paper and miles of scribbling. And yet success in giving proper orders was only possible because we had kept records for years. Perhaps it is best to consider records as a necessary evil, to be discarded as soon as possible.

10 *Automatic Control of Inventories.* This is important. It is the very commonest of errors to put into inventories resources which belong in dividends.

11 *Cost Figures by Analyzing Total rather than by Totaling Innumerable Details.* Cheaper and surer.

12 *A Plain Job for Every Man and Full Responsibility with It.* A man can do more, and prove that he has done it, thus establishing a basis for increased earnings.

13 And lastly: *Don't Try to Overcome Difficulties—Avoid Them.*

Acknowledgments

The general shop layout here described was devised by Mr. Henry S. Beal, assistant general manager of the Jones & Lamson Machine Company. The details of the machine arrangement and the arrangement of the production schedule are the work of Mr. Louis Hronek, assistant superintendent. Mr. George A. Perry, chief engineer, was responsible for the redesign of the product on which this method of manufacture is based, and for the mechanical details of the production scheme. Credit is also due to the personnel of the Fay lathe department, who tried out many of these methods under more difficult conditions.

Individual or Group Drive

ON VERY large work where it is cheaper to move the machine tools to the work than to move the work to the machine, individual drive is, of course, indicated. Any machine that takes 25 hp. to 50 hp. or more, and operates at a fairly uniform load not far from full load, particularly if the speed is high, should be considered for individual drive. In some special applications involving very frequent stops, starts, reversals, or speed variations, the controlling of which absorbs much of the operator's time, group drive is ruled out, due to the convenience of the electric control which makes possible a saving in time over mechanical control, and the fact that the clutches, brakes, etc., necessary to give a comparable operation would require more repair, or give decreased reliability.

In most discussions of this subject it is stated that the power consumed is much less with individual drive. From experience the difference has been more fancied than real. It is true that in the old days when an entire group of buildings was driven from one large engine with belts in tunnels from basement to basement, massive main shafting, bevel gears, or large quarter-turn belts to turn corners, and all the complication of old-time millwrighting, losses in power transmissions were ordinarily 30 per cent, and sometimes with poorly planned installations reached 50 per cent. With modern drives in groups of 7½ to 50, and occasionally (in case of heavy machines) 75 to 100 hp. a large number of tests made under the author's direction indicate an average loss including countershaft losses of 12½ per cent as ordinarily tested, with a probable actual loss in operation of 15 or 16 per cent. Of this loss only one-sixth was in the main lineshafting.

On the other hand, if there is much overtime work in the shop involving the operation of a very few machines in a room, for many hours per year, overtime, with a group drive, the corresponding lineshaft losses from operating the group lineshafting for a few machines may show a decided loss in power as compared with individual drive. Similarly in an industry which is highly but not completely seasonal, where through a part of the year only a few machines are operated, a similar condition arises.

In a large highly organized shop where the inventory of work in progress is kept at a minimum to reduce investment in unfinished product, and where, therefore, a manufacturing delay of a few hours, or a day or two, in one part of the plant will throw many other departments out of step, reliability of motive power frequently outweighs considerations of first cost or power loss.—From an article in *Industry Illustrated*, September, 1924, p. 48.

The Manufacture of Gasoline by the Cracking of Heavier Oils

By C. M. JOHNSON,[1] SHREVEPORT, LA.

The increasing demand for gasoline and the fact that much of the supply of crude petroleum is unsuited to the production of motor fuels have led to the development of numerous processes for "cracking" or decomposing low-grade natural crude oils and the heavier fractions of refinable crudes and thereby increasing the yields of the lighter hydrocarbons. In this paper the author first discusses the principles of cracking and then presents a classification and comparison of the various processes employed for that purpose, pointing out their relative advantages and disadvantages. Following this he describes twelve processes which are in commercial use in the United States, giving dimensions of apparatus as well as data on temperatures and pressures employed, quantities of raw-oil charges, percentages of gasoline obtained, etc.

ALTHOUGH petroleum is widely distributed and although information as to its occurrence and general characteristics seems to have existed from very early times, our knowledge of the chemical nature of this substance has been acquired largely within the past forty years. Within this period a voluminous literature has accumulated which records work as painstaking as has ever been undertaken in the whole field of chemistry, but the commercial method of treating crude petroleum is still essentially empirical. Much knowledge has been acquired as to methods of separating commercial products from crude petroleum, but little has been done to attain the maximum recovery of such products.

The increasing number of motor vehicles in operation, both in the United States and abroad, has brought about a demand for motor fuel which, if it continues to increase at the present rate, will soon far exceed present production by ordinary means. Moreover a large proportion of the world's output of crude petroleum is of such a character as to produce by ordinary refining methods comparatively little gasoline and naphtha. The result is that the demand for these lighter fractions must be supplied by the types of crude petroleum generally classed as "Refinable Crudes." But refinable crudes are capable of yielding, by the usual refinery operating methods, only fractions of their total volumes as gasoline and naphtha.

From time to time the bringing in of a prolific oil field relieves the strain, but the relief is only temporary, as the life of a gusher field is generally short. The discovery of new fields, which is daily becoming more difficult, can hardly furnish a solution of the problem of meeting the ever-increasing demand for crude petroleum. Even if crude oil could be obtained in sufficient quantity to meet the needs of the gasoline market, an excess supply of less desirable products would be bound to result.

The fact that such a large proportion of the supply of crude petroleum is unsuited to the production of motor fuels, has led to investigations of commercial processes whereby yields of these products from a given quantity of refinable oil could be largely increased. It is obvious that if such processes can be successfully developed, the result will be better than if the production of crude oil is proportionately increased. The supply of crude oil will be conserved, and the market will not be burdened with products of limited or unprofitable commercial use. These processes involve "cracking" or decomposition of heavy oils—either low-grade natural crudes or the heavier fractions of refinable crudes—that have at present a low commercial value.

The Principles of Cracking

Cracking is at present in an early stage of its development and an enormous mass of experimental work has evolved only a few commercially complete processes. The result of subjecting hydrocarbon mixtures to heat and pressure, which is called "cracking," or destructive distillation, and which increases the yields of the lighter hydrocarbons, was accidentally discovered as early as 1861 in the operation of a still at Newark, N. J. As originally employed, the process was directed toward the conversion of that fraction of crude petroleum intermediate between the burning (kerosene) oils and the lubricating oils into liquid hydrocarbon products of lower density and boiling point which would be suitable for use as illuminants.

The ordinary processes of refining crude petroleum yield a series of products differing widely in properties and commercial desirability. Those required for the smaller types of internal-combustion engines, such as are now generally used in airplanes, motor boats, and automotive vehicles, are in greater demand. Kerosene and fuel oil, which are used to produce light, heat, or power, are less desirable both with regard to commercial profit and to the conservation of natural resources.

Of the two types of products used in internal-combustion engines—lubricants and gasoline—the former does not yet constitute a problem in the conservation of resources. But the production of gasoline on the present scale threatens to bring about the practical exhaustion of the country's underground supply of crude petroleum. There is no more important problem facing the industry today than that of conservation of this natural resource.

The conversion of all kerosene and fuel oil into gasoline is neither desirable nor possible, nevertheless the proportionate production of volatile distillates from crude petroleum should be increased. The most important means of accomplishing this end is the wider use of "cracking processes."

The cracking process is simply one instance of the well-known tendency of organic substances to decompose on the application of heat. The heavier the hydrocarbon molecule, the more easily it is dissociated (separated). In actual fact, cracking is the rule rather than the exception in the majority of distillation processes involving other than low temperatures.

A natural hydrocarbon oil, or crude petroleum, is a mixture of substances of varying boiling points. Each of the hydrocarbons of high boiling point contained in such mixtures is, during the process of distillation, exposed to various degrees of temperature beyond its own boiling point, so long as the hydrocarbons of lighter gravity and boiling point are not removed from the still. Consequently the liquid hydrocarbons of high boiling point may remain exposed in the still to temperatures below their boiling point for a number of hours. For example, in general refinery practice one to three days is necessary to complete a crude cycle, the exact period depending on the size of the still and the amount of hydrocarbons to be treated. This long exposure to a temperature below the boiling point of a particular hydrocarbon, resulting in its dissociation or partial alteration, constitutes "cracking." As time is an important factor in every organic reaction, the technical significance of the time the oil is exposed to heat becomes evident.

In the cracking of heavy oils two factors largely govern the course of the reactions that take place, namely, temperature and pressure. The function of increased temperature is to break the bonds of groups that make up the complex hydrocarbon molecule. In many processes pressure is of chief importance in controlling the temperature of distillation, but it also exerts an influence on the nature of the decomposition produced.

The temperature at which dissociation takes place with the desired rapidity is usually above the boiling point of the hydrocarbon concerned. When no pressure is employed these hydrocarbons will vaporize and pass out of the reacting sphere, the degree of alteration being small. If, however, sufficient pressure is employed to raise the boiling point to a temperature causing more rapid cracking, alteration into the desired product may be obtained with a minimum of total decomposition. As soon as the action begins to be a total decomposition, permanent gases will be evolved and both carbon and heavy asphaltic bodies will remain as residues. The volume of gas, therefore, if measured, is an approximate index of the degree of decomposition that is taking place. The cracking

[1] Chief Engineer, Invincible Oil Co. Mem. A.S.M.E.

Presented at a meeting of the Mid-Continent Section of The American Society of Mechanical Engineers, Tulsa, Okla., October 11, 1923.

process therefore involves a partial alteration or dissociation, as distinguished from a more complete alteration or decomposition. The object of cracking is to alter the heavier molecules so that low-boiling hydrocarbons will be produced that would not appear on ordinary distillation. Such a process may or may not be accompanied by an appreciable production of permanent gases, depending on the degree of alteration necessary to obtain the desired products. In a simple cracking process as high a temperature as is practicable within the limits of apparatus is desirable, in order to insure a high speed of reactions. A decrease in temperature below a given point will mean a decided increase in time. In commercial practice this would mean increase in operating costs. On the other hand, too high a temperature will mean a large production of extreme decomposition products, so that for results commercially desirable a mean temperature must be chosen that will cause the process to be completed at the maximum speed consistent with a relatively small production of permanent gases and carbon.

The object of any process must be to produce the maximum amount of a commercially desirable product at the lowest commensurate cost. The cracking process produces a mixture of various hydrocarbons which, to be available commercially, must have an initial boiling point not over 140 deg. fahr. and an end point not over 450 deg. fahr. with a gravity range of 50 to 58 deg. B. The product must be water white in color, sweet in odor, and stable in its composition. The use of heat and pressure for cracking is an old art and is not the subject of any existing basic patents. When combined with condensation under pressure it is subject to many patents, of which No. 1,049,667, issued to William Burton on January 7, 1913, and No. 1,123,502, issued to J. A. Dubbs on January 5, 1915, are the earliest of present importance still in general use. These patent claims conflict, as they are—to a certain extent—basic and of primary importance. The validity of the Dubbs patent, the application for which antedated that made by Burton, is now in litigation between the Universal Oil Products Corporation and The Standard Oil Company of Indiana.

CLASSIFICATION AND COMPARISON OF CRACKING PROCESSES

Cracking plants may be considered as employing the following three general methods:

1 Subjecting liquid to both heat and pressure
2 Subjecting vapors to heat with or without pressure
3 Heating liquid or vapor in the presence of a catalyst.

Roy Cross, in his Bulletin No. 16 of the Kansas City Testing Laboratory, classifies the various cracking systems as follows:

I—VAPOR PHASE
- A—Atmospheric Pressure
  - 1 High Temperatures (Pintsch gas)
  - 2 Low Temperatures.
- B—Increased Pressures
  - 1 High Temperatures (Rittman)
  - 2 Low Temperatures.

II—LIQUID PHASE
- A—With Distillation (Distillation necessary)
  - 1 Atmospheric Pressure
    - (*a*) Without chemicals
    - (*b*) With chemicals.
  - 2 Above Atmospheric Pressure (no differential pressures): Dewar and Redwood, Dubbs, Burton, Clark, Jenkins, Fleming
  - 3 Very High Pressure (distilling at a reduced pressure).
- B—Without Distillation (necessarily high pressure)
  - 1 Intermittent
  - 2 Continuous
    - (*a*) Identical heating and reaction zones
    - (*b*) Separated heating and reaction zones.

This outline of the general systems of cracking gasoline is not based upon any general mechanical arrangement. However, most of the patents relating to the cracking of oil cover mechanical arrangement.

Those systems that heat the oil vapor at atmospheric pressure are principally used for making gas. On account of the low specific heat of the oil vapor the temperatures are very high and are not subject to exact control. The pioneering work in the cracking of oil was done in heating in the vapor phase under increased pressure. The really successful processes that have proved profitable are those in which the cracking is accomplished by applying the heat to the liquid phase of the oil.

The method by which a large proportion of the synthetic gasoline is now made is by distillation at pressures considerably above the atmospheric pressure. The reaction and distillation take place in the same still. A great deal of refluxing is necessary and the gasoline must be removed as fast as it is formed. An enormous amount of heat is lost by reason of this refluxing and the reaction is considerably retarded, but nevertheless the distillation is a necessity as otherwise excessive pressures would develop. By the use of very high pressure more reaction can be accomplished in a shorter time, and methods exist whereby this is done, followed by distillation at a lower temperature.

All processes of making gasoline which have not involved the treatment of the oil strictly in the liquid phase are said to have met with only a questionable degree of success. Cracking processes are as yet in the primary stages of commercial application. As a means of supplying the products most in demand their importance can hardly be overestimated. It only remains to discover the most efficient means of obtaining the maximum possible yield of the desired product from any particular oil. The ease and cheapness with which crude petroleum can be transported to regions lacking supplies of crude oil give particular value to cracking processes, as the cheapest and most readily obtainable oils may be subjected to cracking at the place of the greatest demand and most extensive use.

There has been considerable prejudice against the products of cracking processes. It is claimed that burning oils are inferior in light-giving power and more easily acquire a dark color with age. The chief objection seems to be the presence of the unsaturated hydrocarbon compounds which give an unpleasant odor and require the use of large quantities of sulphuric acid in the refining process, which increases the cost of the finished product. The same prejudice seems to exist with respect to the cracked gasoline. Another objection to cracked gasoline is the alleged fact that such gasolines deposit larger quantities of soot in the cylinders of internal-combustion engines, but this deposit may or may not be caused by improper mixtures for proper and complete combustion. Certain investigations tend to show that a properly cracked gasoline gives a greater mileage than a straight-run gasoline, because of a slower-burning quality that gives power during the entire piston stroke as compared with the explosion occurring with straight distillates.

There is therefore reason to believe that instead of being inferior, the cracked gasolines are really superior for use in automobile engines as regards both mileage and power obtainable even though they lack some desirable properties, and this suggests that a blend of "cracked" gasolines and the straight-run gasolines may give greatly improved results.

The pressure-distillation (liquid phase) type of cracking process is the one that seems to have been developed most extensively to date, and at present is the only one that is a factor of real commercial importance in the production of gasoline. Cracking by distillation without pressure is old and has been in use for years for the production of kerosene from heavier petroleum products. It was early discovered, by accident, it is said, that vigorously fired stills, constructed with plenty of surface for reflux condensation, were capable of cracking heavy hydrocarbons into distillates which were largely of the volatility range required for burning oils. The pressure-distillation process was developed when gasoline instead of kerosene became the product most desired. The difficulties involved in its development and operation were considerably greater than those that must have been encountered in the cracking distillation of kerosene; and the development of the Burton process is one of the important scientific achievements of the present day.

The other common type of thermal process is the so-called "vapor phase" process, in which oil is cracked by passage through some sort of system, generally a tubular one, that is strongly heated. Whether the oil is completely vaporized previous to cracking during its passage through the heated zone is questionable, but as regards chemical behavior this type has characteristics indicating a single-phase or vapor-phase system. In the distillation type of process there is for each oil a relation between temperature and pressure. With the vapor-phase processes the two conditions of temperature and pressure can be fixed independently of each other

and of the physical properties of the oil cracked, which, according to the phase rule, makes it possible to regard the cracking zone as a single-phase or vapor-phase system.

Vapor-phase processes have been developed along commercial lines, with a number of modifications, but they seem to differ chiefly in mechanical and operating details, the fundamental principles seemingly being the same. In a broad, general way they consist in passing a stream of oil through the heated zone of the system, this heated zone being maintained at a temperature high enough to bring about the desired degree of conversion. These processes practically always operate under pressure, although this is not an absolute essential as it is for pressure-distillation processes. The temperatures usually measured are those of the cracked product leaving the heated zone, and the figures generally specified in claims or descriptions are between 500 deg. cent. (932 deg. fahr.) and 600 deg. cent. (1112 deg. fahr.).

As regards chemical action in vapor-phase processes, it appears that the gasoline formed by cracking is not removed continuously but remains with the uncracked oil during its entire course through the cracking furnace. This results in the exposure of the gasoline to cracking conditions for an appreciable interval of time after its formation, and gives an opportunity for recracking and consequent formation of permanent gas. On this account, as well as on account of the fact that the temperatures are undoubtedly higher than those effective in the pressure-distillation type of process, the amount of gas formed per unit quantity of gasoline produced is higher in the vapor-phase than in the liquid-phase processes.

The pressure-distillation process is one that seems decidedly advantageous as to chemical kinetics. The temperatures maintained in the body of liquid oil are relatively low. The temperature of the metal surfaces that transmit heat to the oil is undoubtedly considerably higher, but the results of the process warrant considering it as operating at a relatively low temperature. The desired product, gasoline, is removed from the cracking zone practically as soon as it is formed. The gasoline is volatile under the temperature and pressure conditions maintained in the still and passes promptly into the vapor line. These conditions of low temperature and prompt removal of gasoline vapors favor a high yield of volatile liquid hydrocarbons with a minimum formation of those undesirable products—carbon and permanent gas.

While the cracking of oils in the vapor phase would be highly desirable if the product in other conditions were satisfactory, the advantages of cracking in the liquid phase are many and are overlooked by investigators working in the vapor phase. Some of these advantages are as follows:

A lower temperature is sufficient to induce cracking

A higher yield of refined gasoline is obtained

There is a better economy of heat. (The thermal efficiency may be successfully compared with the generation of steam from water on one hand and the superheating of steam on the other; it being a very expensive operation to heat a vapor through a metal)

A more perfect control of temperature. Carbon deposits always in suspension.

The disadvantages chiefly concern operating conditions and sum up as follows:

A large amount of oil exposed to the heat in case of ruptures of the still

Inability to use light distillates such as kerosene without using high pressures.

On the other hand, some of the advantages of cracking in the vapor phase are:

The small amount of oil exposed to heat in the event of breakage resulting in a fire

The possibility of varying pressure and temperature independently of each other, enabling the vapor-phase plant to crack successfully light distillates such as kerosene.

The disadvantages may be summed up as follows:

A majority of the processes operating in this phase are handicapped by the high temperature at which cracking elements must be maintained, which, combined with pressure causes rupture of parts

Formation of carbon on mechanical scrapers or stirrers which ultimately close the tubes

Overheating of the atoms as they come in actual contact with the wall of the tube, which causes decomposition, forming a permanent gas and carbon.

The difficulties of heating a gas or a vapor in a metal container are well known and require no comment other than the fact that it is an expensive operation.

While the past decade has seen an enormous amount of research and invention, the present finds but few processes which may safely be designated as established processes. A conclusion which is soon reached is that no matter how promising a process may appear in the beginning, only extended plant operation determines its commercial success. The operation of the pressure still is approaching something like standard practice in many refineries, but even there has its limitations.

A brief description of some of the cracking systems now in use in the United States follows:

THE BURTON PROCESS

Burton's first patent, No. 1,049,667, was granted January 7, 1913, and the process is extensively used at the present time by the various Standard Oil companies. The development of this process marks one of the milestones in the history of petroleum refining and its originator merits the distinction of being the first to demonstrate that pressure distillation could be done safely and practically on a large scale. The Burton system, with its several modifications, uses the liquid-phase method, heating the gas oil or fuel oil in shell stills (Burton) or in Heine-type boiler stills (Clark), using a thermosiphon circulating system and condensing the vapors under 4 to 5 atmospheres pressure. These systems have considerable carbon troubles, but the results obtained are the standard of comparison in the art.

THE BURTON-CLARK PROCESS

The Burton-Clark still is rated at 210,000 gal. per month or approximately 165 bbl. per day. A typical modified Burton still consists of a horizontal steel shell 10 ft. in diameter by 30 ft. long with forty-five 4-in.-diameter tubes suspended by front and rear headers, very similar to the arrangements of a water-tube boiler. The slope of the tubes is such that circulation is by thermosiphon and the carbon formed is removed from the heating zone and deposited in the shell. The tubes are exposed to the hot furnace gases while the shell itself is protected. Eight-inch vapor lines convey the vapors to aerial condensers which contain approximately 400 ft. of 4-in. pipe. From these aerial condensers the vapors pass through a vapor heat interchanger to the water-cooled condenser coils and thence to a receiving drum in the tail house. Here the condensed vapors settle, partially filling the drum to a desired point. The uncondensed vapors collect under pressure in the upper part of the drum and through proper control valves are conveyed through high-pressure or low-pressure mains to the gasoline recovery plants or to fuel. The light distillate removed from the bottom of the drum is metered and passes on to the run tanks.

Raw oil entering the system is metered and is pumped through the vapor heat interchanger and vapor lines to the still. The reflux from the aerial condensers also returns to the still through the vapor lines. The entire system operates under 75 to 85 lb. pressure and all controls are located within the tail house, which is usually set above the condenser boxes.

The cycle is usually about 72 hours and it is claimed that 60 to 70 per cent of light distillate is obtained overhead, from which 50 per cent of gasoline is secured. The residuum or pressure tar is removed at the end of the run and used for fuel. The carbon averages between 150 and 300 lb. per run and is removed manually.

The Standard Oil Company of Indiana controls these patents and licenses their use to responsible refiners on the basis of 0.4 cent per gal. of oil charged, or about 16.8 cents per bbl. They also stipulate that one-third of the total production of gasoline from their apparatus be subject to their call upon 60 days' notice.

THE DUBBS SYSTEM

The Dubbs system, assigned to the Universal Oil Products Corporation, the first patent of any importance being No. 1,123,502, dated January 5, 1919, operates in the liquid phase. It has certain advantageous features, but appears to be only one of the many pos-

sible forms of utilizing the same basic principles, the relative efficiencies of which are matters of perfection of engineering design and construction. Properly developed, it should give results comparable with other systems of the same general class.

The 500-bbl. units which are considered standard plants consist of heating elements, expansion chambers, a dephlegmator, and condensing and cooling elements, together with an accumulator tank and pumping equipment. The heating elements consist of fifty 4-in. by 30-ft. No. 4 gage seamless drawn tubes connected at the ends by special return bends and forming a continuous coil 1500 ft. long containing approximately 1500 sq. ft. of heating surface. These tubes are set within a brick setting with a separate combustion chamber fired at each end. The combustion gases pass over a partition wall, thence downward over the tubes to the flue and stack. The expansion chamber is a 10-ft. diameter by 10-ft. high hammer-welded steel shell supported by a cast-steel ring set upon a concrete platform. This drum is heavily insulated to prevent excessive losses of heat by radiation. The dephlegmator is an upright steel cylinder approximately 3 ft. in diameter by 12 ft. high, supported by a structural-steel framing and is set about 90 ft. high to the top of the tower. The condensing elements are contained within a steel condenser box supported upon the roof of the control house. The control house is a concrete and brick structure housing the charging and transfer pumps together with the necessary indicating and recording instruments. The residuum cooling coils are set within a steel condenser box resting upon the ground at some convenient point. Pipe, valves, and fittings are designed to withstand the temperatures and pressures at which the system operates.

Raw oil from the storage tanks is pumped through the heating coils, entering at the bottom and flowing upward in countercurrent with the gases of combustion. The heated oil, at about 120 to 160 lb. pressure and 750 to 850 deg. fahr. temperature, flows to the expansion chamber, entering at the top. In this chamber the vapors are released, passing on over to the dephlegmator. The carbon or coke builds upon the bottom of the chamber and the heavy residual fuel oil is continually withdrawn from above the level of the coke. The vapors enter the dephlegmator at the bottom, passing upward, around, and over a series of baffle plates where the heavier ends condense and reënter the system. The light vapors leave the tower at the top and pass through the condensing and cooling coils to an accumulator tank where the pressure is relieved and the pressure distillate passes on to the receiving tanks. The fixed gases are removed from the accumulator and may be passed through a compression or absorption system to secure an additional yield of gasoline and afterward be used for fuel. These gases usually amount to around $1^1/_2$ to 3 per cent of the raw oil charged and contain 0.5 gal. of gasoline per 1000 cu. ft.

The vapors leaving the dephlegmator are controlled to the desired temperature by charging overhead a portion of the pressure distillate produced. This charge enters the top of the tower and falls downward in countercurrent to the ascending vapors from the expansion chamber. This liquid cools the vapors and causes the heavier fractions to reflux into the system and at the same time the vapors impart sufficient heat to vaporize the distillate. This constant refluxing and circulating secures a pressure distillate of desired quantity and quality. Varying the quantity and rate of raw input will affect the percentage of gasoline yield, a large input securing a lesser yield than a small input. This refluxing really amounts to recycling of the residual products. There is little or no carbon formed within the heating elements because of the continuous removal of the heavy fuel oil and the deposit of carbon in the expansion chambers. The relatively large amount of reflux, as compared with raw input, preheats the raw oil. Of the 500 bbl. of raw input, 60 to 70 per cent may pass out as pressure distillate and 38 to 27 per cent as fuel oil, while 2 to 3 per cent remains as carbon.

Before the beginning of a run, chains are suspended and coiled with the expansion chamber. At the end of the run these chains assist in the breaking up of the coke deposit, thus affecting the time required in cleaning the receptacle. The length of a run depends entirely upon the amount of carbon formed within the chamber. When running on topped crude oil the cycle usually runs from 5 to 6 days, and 12 to 13 lb. of coke is formed per barrel of raw oil. When running on gas oil this cycle varies from 5 to 15 days, depending entirely upon the quality of oil.

The fuel consumption appears high, ranging from 6 to 12 per cent of the throughput, but the results obtained seem to justify this item of expense.

The Dubbs patents are owned and controlled by the Universal Oil Products Company, of Chicago, Ill. The company charges a royalty of 15 cents per bbl. of 42 gal. for oil subjected to treatment under the license.

The Greenstreet System

Greenstreet's first patent No. 16,452 was granted in England in 1912. By this method the oil vapors are subjected to heat while traversing tubes in the presence of steam. The oil to be treated is first forced through preheating coils so arranged in the furnace that high temperatures in the liquid are not secured; steam is then added and the mixed oil and steam then enter the cracking coils, where the vapors are subjected to the most severe temperature conditions. From the cracking zone the products leave the coils and enter expansion drums, one of which serves each cracking coil in the furnace. These tanks have the double purpose of equalizing pressures and of continuing the cracking of the oil. Leaving the expanding drums, the lighter vapors are reduced in pressure before they enter the condenser. The heavier products are drawn off from the bottom of the expanding drums. The pressure on the apparatus varies according to the nature of the oils run.

The apparatus consists of a furnace in which there are placed six or more long flat coils of 2-in. tubing, each coil having a continuous length of 425 ft. These coils are suspended from steel beams at the top of the furnace in a way that facilitates easy removal and replacement. The wide range of liquids this system will handle makes it attractive to the refiner. It is merely necessary to adjust the pressure, temperature, and rate of feed of steam and oil to get a variety of results and enable the refiner to manufacture products for which at the time there is the greatest demand. It is claimed that when the conditions of speed, pressure, and sufficient steam are properly coördinated, there is never any carbon formed in the coils.

The Hall Process

Although developed by an American, this process was first tried on a commercial scale in the British Isles, being used throughout the war for the production of benzol and toluol from gas oils. In this country the Texas Company has been interested in the process and has done considerable research. The apparatus in a broad way resembles Greenstreet's, but has a fundamental difference of operation in that steam is not used. The oil traverses the coil and is gradually heated until the most severe conditions are encountered at the outlet when the pressure is reduced to near atmospheric, the speed of the vapors reaching 5000 to 6000 ft. per min. From the expanding drums the vapors pass through a series of dephlegmating towers, where several products of ranging boiling point are removed, and finally to a compressor where the vapors are compressed and then cooled. Each coil is composed of 600 ft. of 1-in. inside-diameter tubing.

The Rittman Process

Nearly every one is familiar with the principles of this method, and a detailed description is unnecessary. Suffice to say that cracking takes place in the vapor phase in an upright tube. The method consists essentially in suddenly gasifying the material to be treated by atomizing into the top of the tube, cracking the gasified material in the absence of any liquid and under a pressure of at least six atmospheres. The vapors and tar are taken off separately from the tar pot at the bottom of the tube. Carbon is removed from the sides of the tube in the cracking zone by mechanical means.

This system is strictly a one-phase system and as the pressure may be held constant and the temperatures varied, or vice versa, it is more elastic in its possibilities than any two-phase process.

The Aluminum Chloride Process

Perhaps the most conspicuous developments under the aluminum chloride process have been carried out by the Gulf Refining Company under the direction of Dr. A. M. McAfee. The oil is heated and stirred in a still in the presence of anhydrous aluminum chloride or other anhydrous salt of aluminum. Before treatment, the oil must be freed from water, and a quantity of the catalyst equal to a

maximum of 8 per cent by weight of the oil charged is added before distillation is begun. Fractionating towers are interposed between the still and the condenser so that the higher-boiling-point vapors may be returned to the still along with the aluminum chloride which has been vaporized and carried over. The distillation is continued slowly at a temperature of 500 to 550 deg. fahr. over a period of 24 to 48 hours. By this method a yield of 15 per cent or more may be obtained from residual oils. At the end of the distillation it is found that the aluminum chloride is enclosed in granular coke—which is easily removed—and that a heavy oil free from asphalt may be separated from the coke and then utilized for the production of high-grade lubricating oils, the recovery of paraffin wax, or the manufacture of petrolatums. The distillate secured is water white and of pleasant odor, and in order to secure finished gasoline it is only necessary to wash with dilute alkali and water. The one difficulty suggesting itself as being inherent in this process is that of recovering the aluminum chloride or of manufacturing it cheaply. It is claimed that the products secured by cracking in the presence of catalysts are superior to those obtained by heat-cracking processes.

THE CROSS CRACKING SYSTEM

The Cross units are rated at 500 bbl. per day and consist of heating elements, a reaction chamber, and condensing and cooling apparatus, together with an accumulator tank and necessary pumping units.

The heating elements consist of two banks of tubes, the upper of preheating tubes and the lower of cracking tubes. Each bank consists of twenty-eight 4-in. inside- and 5-in. outside-diameter seamless drawn tubes 20 ft. long, connected at the ends by cast-steel return bends and forming continuous coils. The cracking tubes are placed in the brick setting directly above the combustion arch, and the preheating coils are arranged directly above them so as to absorb heat from the flue gases. The reaction chamber, as now designed, is a gun-forged steel cylinder of 38 in. inside and 44 in. outside diameter, 40 ft. long. The ends are swaged down to a smaller diameter than the body of the chamber. All apparatus is built to withstand a working pressure of 600 lb. and temperatures up to 860 deg. fahr.

The raw oil is first pumped through the preheating coils, entering at the top and flowing downward to the cracking tubes. No decomposition or cracking takes place in this bank of tubes, since they merely serve as fuel economizers. The preheated oil enters the cracking tubes at the bottom and flows upward to the reaction chamber. The main absorption of heat takes place in this bank of tubes while the pressure in the system is sufficient to maintain the oil in the liquid condition. The temperature and the character of the oil under treatment govern the rate of feed. The oil flows from the cracking coils to the reaction chamber where it is held a sufficient length of time to establish an equilibrium between the liquid and vapor phase—usually about fifteen minutes. A control valve is set at a predetermined liquid level and the oil passes out through the condensing and cooling coils under a pressure of approximately 40 lb. into the accumulator tank from which the gas is removed and used for fuel while the synthetic crude passes on to storage. This crude is then run in the ordinary skimming plant in the conventional manner. During the interval of time for conversion, the carbon is dropped out in the reaction chamber and builds up on the bottom. In general practice 96 per cent of the raw oil passes on through the system to synthetic crude and 4 per cent is carbon, fixed gases, and loss. Sufficient gas is generated within the system to provide fuel for the entire cracking operation. Reducing the synthetic crude usually yields 28 to 29 per cent of gasoline, and if the residual gas oil from this operation were recracked, additional yields of gasoline would be possible. Figured on original gas oil, the first run and one recycle yield approximately 43 per cent, and a second recycle increases the yield to 51 per cent.

This process has a distinct advantage in its ability to crack successfully kerosene distillates; it can also handle fuel oils, although the running time is materially shortened because of the deposition of carbon in the reaction chamber, which is of limited capacity.

Tower stills are being added to the cracking units and it is claimed that the heat contained within the synthetic crude is sufficient to cause distillation, securing the benzene overhead and leaving a gas-oil residuum. The usual cycle when operating on gas oil is 150 to 175 hours.

This system is controlled by the Gasoline Products Company, of New York and Kansas City, and is licensed to refiners for 10 cents per bbl. of raw oil charged. The company has a working agreement with the Texas Company and is negotiating an agreement with the Standard Oil Company of New Jersey and the Standard Oil Company of Indiana whereby an interchange of patent rights on various processes might be of some value to a licensee.

THE FLEMING CRACKING PROCESS

The 200-bbl. units which are considered standard plants consist of an upright steel shell, a dephlegmator, jet condenser, residuum cooling coils, and the necessary pumping equipment.

The still is a hammer-welded steel shell 10 ft. in diameter by 30 ft. high, made of 1-in. steel with heads $1^1/_8$ in. thick. This shell rests upon a cast-steel ring which is supported by a concrete platform. This platform also carries a radial-brick setting surrounding the still which tapers toward the top and terminates in a steel breeching and stack. Heat is generated through four burners set at equal distances around the circumference, and that portion of the steel shell directly opposite to the flames is protected by a light wall of firebrick. The upper five or six feet of the still projects through the setting and breeching and is heavily insulated. Inspection holes are located at convenient places for examining the shell. The dephlegmator consists of an upright steel cylinder 3 ft. in diameter by 12 ft. high, which is supported by structural-steel framing about 53 ft. to the top of the tower.

The still is first charged with 300 bbl. of raw oil, which is gradually heated until the distillates come over. Raw stock is then charged over the top of the tower at a rate of approximately 250 to 275 gal. per hr., receiving a preheating from direct contact with the vapors. At the same time the heavy fractions are knocked down and only the lightest vapors pass over the condensing and cooling apparatus. The preheated raw oil plus the reflux enters the still at the bottom and percolates through the body of oil in the still. To assist clean cutting by a positive control of temperature of the outgoing vapors, a certain amount of the reflux is cooled and pumped back over the top of the tower.

The overhead vapors which leave the dephlegmator are condensed in an apparatus of the jet type. The arrangement is such that a needle-type valve releases the vapor between two cones of water. It is stated that the still pressure is maintained up to the needle valve, but that in the throat of the condenser itself there is no pressure—in fact, that there is a slight vacuum. The combined water and condensate is discharged into a separating tank where the water is drawn off and the fixed gases removed to be used as fuel.

The losses compare favorably with other processes and demonstrate the fact that there is no appreciable absorption of the gas by the water. The scrubbing effect of the water is also valuable, aiding materially in cleaning up the distillate and thus reducing later treatment.

The average cycle, including cleaning, is between 60 and 80 hours, depending entirely upon the quality of raw oil fed into the apparatus. At the end of the run there is sufficient latent heat within the still to distill over between 100 and 150 bbl. of gas oil, leaving a fuel oil of desired viscosity and gravity.

This system is controlled by the M. W. Kellogg Company, of Jersey City, N. J., who are the sole manufacturers, erectors, and selling agents. The company charges $20,000 per still as a royalty, to be paid in two years. After this payment is made the licensee has no further assessments to pay.

THE JENKINS PROCESS

The Jenkins Petroleum Process Company, with headquarters in Chicago, Ill., owns and controls the following United States Letters Patent:

No.	Patentee	Date of Issue
1,226,526	U. S. Jenkins	May 15, 1917
1,321,749	U. S. Jenkins	November 11, 1919
1,239,423	A. D. Smith	September 4, 1917
1,247,883	Stephen Schwartz	November 27, 1917
1,295,223	A. D. Smith	February 25, 1919
1,324,075	A. D. Smith	December 9, 1919
1,374,402	A. D. Smith	April 21, 1921

and various other modifications and improvements which have not as yet been published. The outstanding feature in the Jenkins system is the complete internal circulation of the entire liquid mass in treatment by mechanical means within the unit.

The Jenkins patented cracking still is built very much on the order of the Heine-type water-tube boilers and is at the present time constructed by the Blaw-Knox Company of Pittsburgh, Pa. The main drum is a hammer-welded steel shell 72 in. in diameter by 35 ft. long made of $^{7}/_{8}$-in. steel plate, the ends being closed with dished heads $^{15}/_{16}$ in. thick. The rear water leg is 36 in. in diameter and the front water leg 40 in., both made of 1-in. plate and flanged at the ends for field riveting to the main and transverse drums. The transverse drums at the bottom of the water legs are made of hammer-welded steel 1 in. thick, and are 6 ft. in inside diameter by 10 ft. long; the ends are closed by dished heads $1^{1}/_{8}$ in. thick.

Manheads in the main drum are located in the center of the rear head and in the top of the shell directly above the front water leg. Each transverse drum is also provided with a manhead located in the center of a head—right or left hand as required. The manhead in the top shell is 18 in. in diameter, while the remainder are 24 in.

The transverse drums are connected by 130 $3^{1}/_{2}$-in. No. 8 gage Shelby, seamless, drawn, calorized tubes about 17 ft. long, which are rolled, prossered, and beaded into the flue sheets. These tubes are set 7 in. on centers and are staggered. (At the American Gasoline Plant the stills are provided with 226 3-in. tubes about 16 ft. long which are set 23 rows wide by 10 rows high.)

The stills are designed and constructed entirely in accordance with The American Society of Mechanical Engineers' boiler code. They are designed for a working pressure of 150 lb. per sq. in. and 750 deg. fahr. temperature. After erection and before the settings are erected each still is subjected to a hydrostatic test of 225 lb. per sq. in. at 125 deg. fahr.

For batch-charging and pumping-out purposes there is provided a 4-in. connection in the head of the rear transverse drum located directly under the manhead. In the center of the opposite head there is a 3-in. nozzle used for draining the drum, also for a steam connection. In the top of the main drum, about four feet from the rear head, is an 8-in. nozzle used for the vapor-line connections. Six feet in front of the vapor nozzle and on the center line of the rear water leg is a 12-in. nozzle which supports the propeller-driving mechanism. A 4-in. nozzle located near the front end of the shell is used for the pressure relief valve. On the center line of the rear head and alongside of the manhead is a 3-in. nozzle used for the continuous removal of the fuel oil. The front head is provided with openings for gage glass, pyrometer, and steam lines.

The stills are set independently of the brickwork and are carried by three steel stirrups supported by structural-steel framing. This framing also serves to support the operating superstructure.

The brick settings are so designed and constructed that only the tubes are subjected to the gases of combustion, the front and rear water legs, transverse drums, and main shell being protected by brickwork.

A cast-steel propeller of proper diameter and pitch is used to maintain a positive circulation of the liquid within the still, thus securing a very efficient transfer of heat through the tubes from the gases of combustion of the liquid. This propeller is at the present time being driven by a 30- or 50-hp. constant-speed motor directly connected with the shaft. Plans are being prepared to substitute a steam-driven unit in place of the motor in order to secure the flexibility of varying speeds. The propeller-driving mechanism is housed within a steel-frame, corrugated-iron building supported by the structural-steel still framing. A small steel-frame, corrugated-iron shed is built over the front head of the main drum to house the pyrometers, pressure gages, and gage glasses. Steel walkways and stairways provide easy access to all operating points.

An 8-in. extra heavy O. S. and Y. gate valve, fitted with a $1^{1}/_{2}$-in. bypass, is bolted to the still nozzle. The vapor line terminates in a tower 60 in. in diameter by 16 ft. high which is supported on framing above the condenser box. This tower was built by the Kansas City Structural Steel Company and consists of three drums each 60 in. in diameter by about 4 ft. high, which are connected by two groups of 120 tubes 2 in. in diameter by 2 ft. long. Vapors from the top section are conveyed through conventional condensing and cooling coils to the receiving house.

These stills are first charged with 150 to 155 bbl. of oil, which is gradually brought up to the proper temperature and pressure, this usually requiring about seven hours. The 8-in. valve on the still vapor nozzle is closed during this portion of the operation and the $1^{1}/_{2}$-in. bypass is used to control the pressure within the system. During the next 92 hours raw oil is fed into the still at an approximate rate of 25 to 30 bbl. per hour. Two hours are then required for pumping out and six hours for steaming and cooling down. The cleaners then enter the drums and remove the accumulation of carbon. The tubes are cleaned out by means of air-driven flue cleaners, this cleaning operation consuming about fourteen hours. Thus the entire operation sums up about as follows:

Charge, 150 to 155 bbl.
Feed, 25 to 30 bbl. per hr. (600–750 bbl. per day)

	Hours
Fire to over	7
Over to off	92
Pumping out	2
Cooling and steaming	6
Cleaning and heading up	14
Charging	2
Total	123

This cycle of 123 hours is an average operation at the American Plant and does not represent a maximum, as this depends entirely upon quality of raw feed.

The vapors released through the bypass are conveyed through an 8-in. vapor line into the lower chamber of the tower, passing upward through a group of tubes into the second section of the tower, and then through another group of tubes into the top section of the tower. A heavy cut is removed from the lower section and an intermediate cut from the center section which are rerun in fire stills yielding benzine overhead with gas-oil bottoms. (This gas oil forms a recycle stock.) The light cut overhead from the rerun operations is combined with the light cut taken from the upper section of the tower and treated, then steam stilled, yielding finished gasoline overhead with kerosene-distillate bottoms.

The fixed gas is trapped out of the system in the receiving house and by means of a small blower is forced through a water drum to a gas holder and to burners under the boilers. The water drum serves to clean the gas and remove the hydrogen sulphide, although primarily designed to prevent a flashback through the lines. The fuel oil containing the carbon—about seven per cent of the charge—is continuously removed from the still from a "quiet zone" at the rear end of the main drum.

THE COAST-COSDEN SYSTEM

The Coast stills are rated at 150 to 160 bbl. of gas oil per day. The still consists of a horizontal steel shell 8 ft. in diameter by 40 ft. in length, set within common brick settings. The fire sheet is kept free of carbon by a rocker-arm movement which drags a series of chains across the bottom of the still, thus keeping the carbon in suspension. Vapors are conveyed through three shell-and-tube-type aerial condensers or horizontal reflux towers to the control house, where the pressure is released and the vapors condensed at atmospheric pressure.

The initial charge of the still is 250 bbl. of gas oil, which is raised to an operating temperature of 750 deg. fahr. The pressure within the still is raised to 80 lb. per sq. in.

As the vapors pass through the towers 90 per cent is condensed and refluxed into the still to be cracked further. Uncondensed vapors are released from pressure in the receiving house by means of a valve, after which they pass into the condenser.

The pressure in the still is shown by a gage at the pressure relief valve in the receiving house. A thermometer at the same point shows the temperature of the still. Regulation of the pressure is accomplished by increasing or decreasing the flow of still vapors through the pressure relief valve to the condenser box.

After leaving the condenser the pressure benzine passes through a gas and water separator and then through a meter where the amount is carefully checked. Another meter in the receiving house records the amount of gas oil being pumped into the still through the preheater, and the two meters are synchronized so that the level of fluid in the still will not vary in height.

The gas oil pumped through the preheater is raised to between

300 to 350 deg. fahr. before it reaches the still. This effects a considerable saving in fuel as well as reducing strains on the still which would be caused by the introduction of cold liquid.

During the cycle 150 bbl. of gas oil are pumped into the still, which brings the total oil treated to 400 bbl. The cycle is 60 hours, making the still capacity approximately 160 bbl. per day of 24 hours. The 60-hour cycle consists of 52 hours running time, 7½ hours charging, cooling and steaming, and ½ hour cleaning.

Of the gas oil charged, approximately 70 per cent goes over as pressure distillate during the cycle, 26 per cent remains as fuel oil, and the still loss is around 4 per cent. Treatment of the pressure distillate before steam stilling causes a loss of 2 per cent of the distillate.

It is claimed that, based on actual operations over a considerable period, the distillate yields 61.2 per cent gasoline, 7.2 per cent kerosene, 30.6 per cent fuel oil, and a loss of 0.9 per cent, which, figured back on the gas oil charged, shows:

40 per cent 56 deg. B. 437 E. P. gasoline
7 per cent 42 deg. B. water-white kerosene
47 per cent 22 deg. B. fuel oil
6 per cent loss.

The yields as given are those obtained from the first cycle on gas oil. The average fuel consumption is given as 9 per cent of the total charge to the still.

The process is being offered for sale and installed exclusively by the F. W. Freeborn Engineering Corporation, of Tulsa, Okla. The royalty charged is ½ cent per gal. on gasoline produced.

THE ISOM SYSTEM

The Isom system, U. S. Patent No. 1,285,200, as adopted by the Sinclair Refining Company, operates at 100 to 125 lb. pressure and at temperatures rarely exceeding 750 deg. fahr. The Isom stills have charging capacity of 235 bbl. of raw gas oil and operate at a rating of approximately 1200 bbl. per day. The heating elements consist of fifty 4-in. tubes fitted with Foster superheater rings containing 2700 sq. ft. of heating surface, while the oil is heated over 900 sq. ft. of tube surface. The oil is circulated through these heating elements which are arranged vertically in the furnace by means of a Connersville 14- by 28-in. two-lobe hot-oil pump to and from a horizontal still 9 ft. in diameter by 32 ft. long. The vapors released in this still are conveyed through a reflux tower 60-in. in diameter by 28 ft. high. The system is charged continuously during the cycle by pumping the raw oil over the top of the tower. Vapors are condensed under pressure, and the regulating valves for the continuous draw-off as well as for the condensates are located in the receiving house.

The stills are operated on a 48-hour cycle: 30 hours of continuous running and 18 hours for starting up, cooling down, and cleaning. Depending upon the rate of charge and how hard the heaters are fired the following results are obtained: 500 to 800 bbl. of 49.8 deg. B. distillate received overhead, and 500 to 800 bbl. of 24.0 deg. B. pressure tar drawn off per run of 30 hours.

Under normal operating conditions, 50 per cent of the continuous-charged gas oil comes over as distillate, 45 per cent of the continuous charged gas oil is drawn off as tar, and 7 per cent of the continuous charged gas oil is loss and carbon.

Simpson's Rules Generalized

BY W. F. DURAND,[1] STANFORD UNIVERSITY, CAL.

SIMPSON'S rules (so called) for finding areas bounded by an irregular curve have long been a part of the every-day working material of the engineer.

Those best known and most employed are presumably the so-called "one-third" and "one-twelfth" rules. The former gives any area $OABC$ as in Fig. 1, in terms of the three ordinates, y_1, y_2, y_3, and the common interval h. This rule is

$$A = \frac{h}{3}(y_1 + 4y_2 + y_3) \quad \ldots\ldots [1]$$

or in symbolic form,

$$A = \frac{1}{3}(1 + 4 + 1) \quad \ldots\ldots [2]$$

The latter or one-twelfth rule gives any area $EDBC$, Fig. 2, likewise in terms of the three ordinates y_1, y_2, y_3, and the interval h. This rule is

$$A = \frac{h}{12}(5y_3 + 8y_2 - y_1) \quad \ldots\ldots [3]$$

or in symbolic form,

$$A = \frac{1}{12}(5 + 8 - 1) \quad \ldots\ldots [4]$$

Now these rules, and in fact all such rules generally, presuppose a uniform value of the interval h—an equal spacing of the ordinates. In some cases, however, the known information, represented by the ordinates, presents itself at irregular or unequal spacings. In such cases these rules cannot be applied.

For these reasons it has seem desirable to develop forms of rules covering cases such as those in Figs. 1 and 2, but with the two intervals unequal in value.

It should perhaps be noted at this point that the unit of area in these diagrams, consisting as it does of two intervals and three ordinates, develops out of the assumption that the actual irregular curved boundary is replaced by a series of second-degree parabolic arcs, each such arc spanning two intervals and thus comprising three ordinates. A second-degree parabolic curve may of course be passed through any three points and may thus be made to fit any three ordinates, and vice versa any three ordinates will serve to determine a parabolic arc of the second degree.

The problem then becomes one of finding the area under a parabolic arc of the second degree such as AB in Fig. 1, and bounded by the two end ordinates y_1 and y_3, and of then expressing this area in terms of the three ordinates y_1, y_2, y_3—all under the general assumption that the two intervals may have any values h and k instead of the same value h.

For present purposes we may omit the mathematical details and give simply the results. For those who may be interested in such details, an outline of the process is given later in a supplementary note.

Referring to Fig. 3, we may write the resultant rule as follows:

$$A = \frac{h + k}{6hk}\left[(2h - k)ky_1 + (h + k)^2y_2 + (2k - h)hy_3\right] \ldots [5]$$

In Fig. 3, as shown, the axis is turned vertically and the ordinates y are laid horizontally. This permits the convenient placing of the multiples against each ordinate. This with the outside factor $(h + k)/6hk$ will give then the area as desired.

It will be readily seen that if $h = k$, the rule in its simple form in [1] results.

An interesting case develops when $k = 2h$. In this case the multiplier for y_1 becomes zero and the parabolic area is correctly determined in terms of the two ordinates y_2 and y_3. Those interested in the properties of the parabola will find the examination of this point a pleasant exercise.

Turning next to Fig. 4, we have

$$A = \frac{k}{6h(h + k)}\left[h(3h + 2k)y_3 + (h + k)(3h + k)y_2 - k^2y_1\right]. [6]$$

This gives the hatched area between y_2 and y_3. A symmetrical

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formula for the area between y_1 and y_2 is of course readily written if desired.

Through the repetition of rule [5] and, if necessary, combination with [6], an area of any extent and with any number of ordinates spaced in any manner whatsoever may be determined with the degree of accuracy characteristic of the parabolic arc as a substitute for the actual curved boundary.

A third case sometimes arises as indicated in Fig. 5. In this case the ordinates y_1, y_2, y_3 are known, with intervals h and k for example. It is then desired to extend the integration or the measurement of area so as to include a farther ordinate AB, not known as to value,

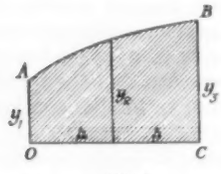


FIG. 1

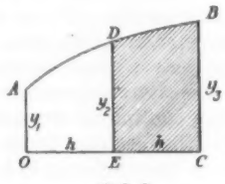
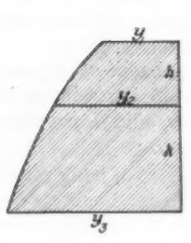


FIG. 2



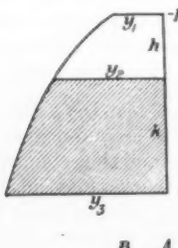
$(2h-k)\,k$

$(h+k)^2$

$(2k-h)\,h$

External Coefficient $\frac{h+k}{6hk}$

FIG. 3



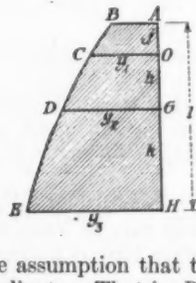
$-k^2$

$(h+k)(3h+k)$

$h\,(3h+2k)$

External Coefficient $\frac{k}{6h\,(h+k)}$

FIG. 4



$kl(2l-3k)$

$l(h+k)(l-3j)$

$hl(2l-3h)-6hjk$

External Coefficient $\frac{l}{6hk\,(h+k)}$

FIG. 5

but on the assumption that the parabolic arc CDE is extended to cut this ordinate. That is, $BCDE$ is assumed to be a single parabolic arc of the second degree, as fixed by the three ordinates y_1, y_2, y_3, and then the entire area $ABEH$ is desired.

The result in this case is as indicated in Fig. 5. These values are readily simplified to the case where $h = k$.

If in the formula of Fig. 5 $j = 0$, the values take the form of those for Fig. 5, as of course they should; and if furthermore $h = k$, they reduce to the usual form of Equation [1].

Supplementary Note

The foregoing formulas are readily derived by employing the following procedure:

The general equation of the parabolic arc is taken in the form

$$y = ax^2 + bx + c$$

For x, then, we may substitute successively 0, h, and $(h + k)$, thus giving y_1, y_2, and y_3.

The area of such a curve between the limits 0 and $(h + k)$ is then found by integrating ydx and putting in the limits. This area will contain the coefficients a, b, c. Next these values a, b, c are found from the values of y_1, y_2, y_3 by considering them as three simultaneous equations in a, b, c. This gives values of a, b, c in terms of y_1, y_2, y_3, h, and k. The value of the area will be in terms of a, b, c, h, and k. Then substitute in this value for the area the values of a, b, c in terms of y_1, y_2, y_3, and the result will give the area in terms of y_1, y_2, y_3, h, and k, which is the end sought.

The Engineer in City Activities[1]

IN OUR modern transportation, especially the automobile, we are facing an element in city planning quite as important as the passing of the city walls. Our cities have no boundaries. With a motor car, a half-hour's ride from the city means many miles. Little farms and the lure of the country are attracting many. No one will question the healthfulness and desirability of the movement. Certain features of it suggest the need of more fundamental study of the city's resources. Is the city, from the point of view of organization, legal authority and community spirit, advantageously equipped to solve its new problems?

Our problems of traffic and housing are far from being solved. These two questions, such an important part of the daily cycle, are intimately connected with the efficiency and contentment of the productive workers who really make the city.

Within this great human dynamo, this industrial city, we have the governmental city, caring for the common needs and common interests of its inhabitants. The city's legal authority, its power to do, comes from a recognition of its special fitness to supply these needs.

That some such legal mechanism is necessary may be seen at once if we recollect how greatly the city's functions have increased in the last 300 years. The city of that time had no general system of sewers or water supply. Municipal lighting was a very limited affair. Systematic public school education, public libraries, and public health service were then unknown. The public service corporation was in its infancy. The development of these multitudinous functions has meant the solution of a problem with three phases a technical, a legal, and a financial program. Any suggestion for improvement must consider all these aspects.

If the development of the city were simply adding a few more units as one would add cases to a filing system, the various programs would all be simple. But the technical problem is far more complex. Take the well-known example of city water supply. The per capita consumption of a city of a million inhabitants is generally three times that of a city of a hundred thousand. The water has to be carried three times as far in the larger city, with the result that the per capita investment will be four or five times as great. A similar increase will be observed in the cost of sanitary systems, lighting, and other utilities.

The growing value of suburban property is due to the growth of the city. The city creates this value and then helps to maintain it. City taxes make large contributions to the "unearned increment" of the real-estate speculator. Yet the legal control of the city over the subdivision has been almost negligible, and voluntary planning in the interest of the city is rarely known.

An example of desirable extension of the city's power might be given in the application of zoning, not only to the area within its boundaries but without. In practically all of the great European municipalities, the government has entire control of its water front. The city has a vital interest in this low-lying land. It must look after the general health of those who inhabit it. It must also provide the trunk sewers and the pumping stations to keep it drained. Low-lying lands should be converted into parks, and not be permitted for residential use.

Another reason for the control and restriction of subdivisions is the fact that after initial improvements are accepted the city must maintain the subdivision. The familiar sign "sewer, water, sidewalks, and cinderized roads" means no guarantee as to quality. Often the work is so poorly done as to be useless in a few years—a sheer and total economic loss. An engineer's uniform specification adopted by the state as a whole would be a valuable remedy.

Let us study what was done in expanding the medieval cities of Europe. Their solutions of the engineering, legal, and financial problems of city planning furnish many and valuable precedents. Let us, as engineers and architects, familiarize ourselves with these data, so that in place of simply waiting to be told, we may play the part of leaders, educators, and constructive thinkers and by our united efforts make a real contribution to the city's growth.

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[1] Extracts from a paper by A. L. Trout, Ann Arbor, Mich., which was awarded a silver cup donated by the Detroit Section, A.S.M.E., in a recent civic-welfare paper contest. Reprinted from the Bulletin of the Associated Technical Societies of Detroit, Aug. 30, 1924.

The Design of Ordnance Matériel

Procedure to be Followed in Designing Ordnance Matériel for Economical, Interchangeable Mass Production

By J. D. PEDERSEN,[1] SPRINGFIELD, MASS.

THE considerations in the design of ordnance matériel are essentially the same as those proper in the design of any mechanism of similar class whose volume of production is likely to warrant the most advanced and complete manufacturing equipment. Interchangeability of component parts, when produced by proper equipment, insures a better and a cheaper mechanism than one whose components are non-interchangeable.

In ordnance matériel, for example a machine gun or an infantry rifle, all the advantages of interchangeability are now accentuated and demanded. It is indeed fortunate that the manufacturing equipment best adapted for mass production is also the best means of securing interchangeability of components.

To attain mass production readily and at low cost, the proper manufacturing design of the components to be produced is of vital importance. With such a design, good methods and machining equipment and correct limit gages are required to secure interchangeability and volume production.

Ability to manufacture requires an organization of men and machines. In the epoch of non-limit gages from which industry is emerging, more time was required to train the personnel than was used to design, build, and provide the mechanical equipment for a new product. And the training could not start until the mechanical equipment was ready.

When non-limit gages are used, fair but not interchangeable components can be produced. Training, skill, and good judgment are necessary to make the product even "close" to such gages. Due to the former prevalence of the "Yankee mechanic" and his excellent judgment, fair results could be obtained after a colony of workmen who had become skilled in its product grew up around a plant.

The "Yankee mechanic," however, is passing, and his place is being taken by workmen of lower ability and less zeal. On the other hand, the general trend of development in mechanism is toward greater intricacy, which imposes ever greater demands for accuracy of production.

Reconciliation of these opposed conditions, to permit progress, can only lie in perfecting our technique and the complete use of limit gages. Limit gaging not only requires a minimum of skill and judgment on the part of the factory personnel, but enables a result to be accomplished not otherwise attainable. When applied to the manufacture of components whose tolerances have been correctly analyzed and determined, production quickly resolves itself into fairly simple routine.

In the design of ordnance matériel no pains should be spared to reduce the manufacturing possibilities to the forms best and most quickly obtainable. War comes suddenly and catches us without an adequate supply—in instances with little more than models—of the weapons we contemplate using. Contracts are let in vast numbers. Factories are improvised and special manufacturing equipment started. Organizations are hurriedly augmented, necessarily with a large portion of labor and superintendence totally ignorant of the product to be made. Then is no time to deliberate on *what* to make. Action is demanded. Zeal too frequently is substituted for ability. The whole nation is crying for guns, at once.

A Picture Typical of Production During the Great War

At the present time full benefit is not generally obtained from the use of limit gages and our other means of mass production, except by a few advanced organizations. This may be exemplified by a picture typical of production during the Great War.

A factory has received production orders and component drawings of the mechanism desired. One or more models illuminate these drawings. The models function well in themselves, and their parts may readily interchange from one to the other.

Upon measuring the components of the models it is found that in many particulars they do not agree with the drawings nor among themselves. Frequently the drawings may carry tolerances not easily procurable under production methods. Attempt is made to reconcile the models and drawings and to finally establish manufacturing limits. The correct tolerances are easily enough applied in the case of simple male and female engagements, also in the case of surfaces requiring only an "atmospheric fit." In the attempt to follow through the tolerance accumulations in a functional train involving several components we begin to bog down: too many seemingly conflicting conditions. Accumulated variations mount up alarmingly in places, and many tolerances are set which later prove to be impossible of ready attainment. Or attainable tolerances may arbitrarily be set which later do not produce interchangeability.

Many tolerances are set at "round table" conferences. The inventor groans if a variation of more than one one-thousandth of an inch is suggested, while the milling-department foreman is made happy by a tolerance of a thirty-second of an inch. Somehow the tolerances are finally set, component drawings brought up to date, and the special equipment of fixtures, gages, and cutting tools designed and built. So far, in spite of many small difficulties, all has seemed fairly clear sailing, and hope is strong that the imminent production schedule will be met.

As the special equipment becomes available, the fixtures are set up on their belted machines and tried out. Many fixtures and gages have to be sent back to the tool room for correction. Certain operations will not produce to gage. These require changes to improve. Certain others will produce to gage only by careful nursing of the operation. "Let's go—we must meet the production schedule." Finally all the machine operations are ready and a few of each of the components are delivered to the assembling department.

Our troubles are about to begin. Certain parts will not assemble without being changed—investigation shows an affected surface to be outside its gage limits. Certain other components will not assemble, although everywhere within their gage limits. Or a few guns may assemble without fitting, but not satisfactorily perform the required functions. Apprehension justly arises that the components have not been correctly specified. The main office seems to be cruelly insistent about guns in the shipping cases.

We now begin to realize the import of the word "trouble." A detachment of "trouble shooters" is hastily organized, many suggestions considered—some adopted—and changes to equipment are started. The production schedule has already been badly bent, but hope still lingers that by extra effort we can yet swing in with the final quota. The necessity of frequent "explainings" to the main office does not add to our peace of mind and ability to secure results. Yet important decisions have to be made as to the continuing or stopping of machining operations. Continuing may accumulate a mass of useless components. Stopping may unduly delay progress and result in no components for the assembling department to practice upon. During the "tuning up" stage, machining on certain components may be stopped and started several times.

In time the components carrying the newly adopted changes come to the assembling. In general the original troubles seem settled. But new ones crop out in unexpected places, some as unanticipated results of previous changes. The necessities of still more changes develop from time to time and these are made. Matters are improving, however, as one by one the troubles are run down.

After much travail it is one day realized that tentative assembling can be started. This soon grows into "guns in the warehouse"

[1] U. S. Armory.

Contributed by the Machine Shop Section of the A.S.M.E. and presented at the Machine-Tool Meeting, New Haven, Conn., Sept. 15–18, 1924.

in increasing numbers. But many months have passed and an entirely new schedule must be set up if we are to retain any hope of hitting it. During the course of the entire production troubles frequently arise, but we now have at hand those who have become proficient in tracing and solving the troubles to which this particular mechanism seems subject.

Several factories may have had contracts for the mechanism whose production is pictured. Each factory has had its own special troubles and very frequently its own solution. Eventually the product of one plant became differentiated from that of another.

Many of those who have been actors in the above picture have concluded that approximately the travail described is inseparable from getting production under way. A thorough survey, however, after participating in a number of such pictures, indicates otherwise. The net result of all the necessary changes shown in the picture was finally *the adoption of attainable tolerances with limits adjusted to secure interchangeability.*

Groping in the dark of cut-and-try methods is very tedious, costly, and inconclusive.

Troubles and Delays Avoided by Initial Proper Design of Components

Nearly all of the troubles and delays at the start of and during the course of production may be avoided by initial proper design of the components to be made. The possibility of such design has been amply demonstrated.

Most plants are not engaged in the continuous launching of new models. Their engineering organizations are consequently reduced to those necessary to handle production routine, upkeep, etc. An engineering organization capable of correctly analyzing and determining proper manufacturing design and of designing correct production equipment for a new model can rarely be improvised. Months are required to develop such an organization.

It would seem that the service of analyzing a manufacturing design, as well as a proper equipment design to produce the same, could advantageously be supplied by a concern whose business is that of building gages and special tools. Continuous engagement would permit the development of an able engineering corps along the lines of consistent progress. The effect of a few organizations of this nature would soon become apparent and they would do much to improve our industrial position when brought into competition with reviving European industry based on cheaper labor.

A mechanism of the class discussed contains from 100 to 300 component parts, all but one or two of which are of steel, frequently alloy or high-carbon steel. The components are machined from forgings or from the solid bar, and many of them receive heat treatment. There are no unmachined surfaces. In the infantry rifle about 1500 distinct operations, 700 of them being machining operations, are required for its various components. The machine gun requires many hundred distinct machining operations. To control each machining operation one or more limit working gages is necessary. A similar set of gages bearing the adopted limits should be used to inspect every machine operation on substantially every component. Many surfaces are formed by second or finishing operations.

The majority of machining operations consist of milling; next drilling and reaming. Profiling, slotting, shaving, boring, turning, grinding and screw-machine operations are frequent.

To maintain the factory discipline necessary to secure interchangeability and easy mass production, all work must be rigidly inspected. Any component not entirely within its gage limits should be rejected. The tolerances adopted for each operation, therefore, must be readily attainable with the equipment when operated by the class of workmen available during war-time production. *Such tolerances only* will permit the fair rejection of any work which may be outside its gage limits.

Tolerances Attainable between Proper Locating Points and a Given Surface to be Machined

Experience in volume production of the class under discussion has suggested the following attainable tolerances between proper locating points and the surface considered:

	Tolerance, inches
When surface is formed by milling, profiling, slotting, or shaving	0.008
With slightly more care	0.006
With second or finishing operation	0.004
Finishing a small, simple spot	0.002
Surface grinding on magnetic chuck	0.003
Greater care and use of revolving chuck	0.002
(Close parallelism can be secured by the latter method.)	
Axial position of fairly short jigged holes	0.002
With refined equipment and skill	0.0005
Position of end of milling cut when procured by ordinary "knock off" of power feed	0.030
End of milling or shaving cut if hand fed against stop	0.006
Hand fed with skill against special stop	0 003
Position of shoulders or ends of holes dependent upon ordinary spindle stops	0.015
With greater care	0.006
Skill with special stops	0.002
In the case of generated sizes dependent upon the cutting tool being moved to a stop, such as turning, boring and center grinding, in diameter	0.006
With some care, in diameter	0.004
With skill and refined equipment, in diameter	0.002
Grinding short pieces with skill, in diameter	0.001
In the case of sizes dependent upon the dimensions of the cutting tool these tolerances are readily attainable: width of slots formed by milling, shaving, etc	0.008
If second cut	0.004
If second cut and tool frequently changed	0.002
Diameter of fairly short holes or stems if drilled or hollow milled	0.004
Single-reamed or box tooled	0.002
Second-reamed or box tooled	0.001
Second-reamed, with skill. (As for locating holes or for driving fit)	0.0006
Diameter of long holes such as in rifle barrel, where several reamings are done	0.0015
Special care, with some selection	0.0006
Diameter of rifling grooves	0.003
With special care	0.0015

The above list of tolerances procurable by various methods will serve as a guide. Special conditions in certain operations may require departures. Experience has shown that ordinarily little will be gained by the adoption of tolerances much in excess of those suggested at the larger end of the range. Too great tolerances breed carelessness in production. Cost begins to mount increasingly as the smaller end of the range is specified.

Requirements of Tolerances for Mass Production

Tolerances for mass production are required to cover the legitimate variations demanded by the following:

Lack of rigidity in belted machine, even in good condition
Spring in cutting tool or arbor
Adjustment of cutting tool with respect to position and shape or size of tool
Variation due to minute clearance between components, locating holes and their locating pins on machining fixture.

Other variations caused by undue spring of cutter, improper locating points on component, faulty design of machining fixture, etc. are not legitimate variations and should be avoided by proper methods and correctly designed equipment.

As part of its final design each component should be adapted to be located in its standard machining fixture. With few exceptions the best location is obtained by a plane locating surface on the component. Two holes of ample size and of accurate spacing and diameter are carried in and normal to the locating surface. If the component does not functionally require such a plane surface and holes, these locating points should be introduced upon it for machining purposes. The objectionable portions of the locating points would be removed by a final operation.

Essential Elements of Best Machining Fixture

The essential elements of the best machining fixture consist of a locating plate carrying two locating pins and mounted on the nonmovable part of the fixture. The plate is provided with repairable raised contact spots. The component is moved, in parallel, on to the locating pins to contact with locating plate, by a movable jaw driven preferably by a quick-action locking cam which holds the work immovably under the cutter. Opening of the jaw draws

the work, in parallel, off the pins. Stops approximately position the work laid in the open jaw in such a manner that a simple closing of the jaw perfects the correct location of the component.

In this type of fixture it is to be noted that the component is automatically positioned correctly in the second and third planes by the locating pins, and that the most favorable conditions are provided to correctly position it in the first plane. The chances of error in location are thereby reduced to less than one-eighth the chances existing where the workman must exercise his own care to insure correct positioning in all three planes. The best results cannot be expected from the time-honored practice of hammering down the work into a vise.

In providing manufacturing equipment the fixture adopted as standard for each component can be built to the required number on a small manufacturing basis. This frequently reduces the cost below that incurred by building a variety of fixtures for a given component, even though this variety may at first seem expedient. A type or standard fixture for each component also permits a greater concentration of attention to details in fixture design. Position gages may also be designed along the lines of a type for each component.

Reference blocks should be provided for the setting and easy checking of the gages required for each operation. Given proper design of the components, production possibility is based upon the integrity of the gages. Both working and inspection gages are subject to wear, according to conditions. A periodic gage inspection of ample frequency should be made a rigid part of production routine. The system of gage checking based upon the use of accurately made model parts has proven unfeasible. The finished model components frequently do not carry their locating points and in addition are too much subject to distortion. Many of the reference blocks can be advantageously provided by accurately forming, on an unfinished component, the surfaces of the desired machine operations.

Upon the manufacturing design of ordnance matériel of the class discussed will depend not only its excellence of performance but its capabilities of being produced in large quantities by mass-production methods in a number of independent plants. Clearly the final designer of the component parts of the mechanism must have at his fingers' tips a thorough knowledge of the best methods of machining, fixturing, and gaging appropriate for each machine operation. Without previous detailed experience in mass production, the designer cannot bring to bear a proper knowledge and decision upon the subject.

In the proper design of ordnance matériel or similar mechanism, no pains should be spared to arrange the surfaces of the components for easy machining and gaging. A limit analysis is useless which contemplates the setting of unattainable tolerances with the methods specified. Full benefit from our present knowledge of limit gaging, work holding, and machining can only be attained when these are applied to the mass production of a design which is correctly based upon these methods.

Let it be assumed that mass-production equipment is ordered for the manufacture of a weapon just adopted. One or more properly functioning models are available, also probably the drawings to which these models were made. As the combination of inventor and production designer in one individual is so highly unusual, the usual models will merely show that functioning is possible with components of the dimensions contained in such models. These models must therefore be considered as being merely a successful laboratory experiment, upon which are based hopes of mass production of similar mechanisms which will perform the functions demonstrated by these models.

Analysis of Possible Effects of Accumulations of the Tolerances Demanded by Mass-Production Methods

We are now at a stage whose importance is all too frequently not realized. That the component parts in the models properly function, proves only that they will do so in the few models in which they may have been tried. This carries no proof that component parts made with the variations demanded by mass-production methods will correctly assemble in all combinations, to perform the intended functions. Such proof can be had only by a mathematical analysis of the possible effects of accumulations of the tolerances demanded by mass-production methods.

In this analysis, proper locating points should first be chosen for each component. This set of locating points should be made standard for that component and should be used for all machining operations and all position gaging. Diameter of holes, pins, screws, etc. should also be reduced to the fewest sizes permitted by the requirements.

The drawing for the component part should clearly specify the locating points and, where necessary, indicate the methods of producing them. The positions of all the elements limiting the tolerance zone of each finished surface should be independently dimensioned from the locating points, excepting in cases of which the following are examples:

1 The limit widths of a slot to be finished in one setting of the machine are given directly, while the limit location of the desired slot wall is referred to the working points. This arrangement is most fair to the machine adjuster and also makes possible the use of simple plug gages for width.

2 Another exception is the case of a demanded special relationship between two surfaces formed by separate operations. In this case the best procedure will be outlined later. While it has been argued that each surface should be located from that other surface on the same component to which functionally it is most closely bound, experience on the type of work discussed has shown that the best results are obtained by locating substantially all the surfaces from standard locating points properly chosen for that component.

If various locating points are used for machining and gaging a component, the resultant maze of tolerance accumulations could not, in many instances, be untangled by even the famed legal expert from the City of Brotherly Love.

The failure to use the same locating points for all the machining and position-gaging operations on a component is bad practice and its effects are insidious. It frequently results in itself absorbing the permissible variation of a given surface. In many such cases has been witnessed a condition which left to the actual operation "less than no tolerance." Good engineering should not waste or absorb any of the permissible tolerances. These should all be given, as intended, to the actual machining operations.

Having determined the locating points of a component and the steps for obtaining them, the general characteristics of the machining fixture standard for the component should next be determined.

Selection of Tolerance and Limit Analysis

Choosing of tolerances, and limit analysis, are now in order. The adoption of attainable tolerances and the correct analysis of their effects under all conditions is the crux of interchangeable manufacturing and mass production. Attempt should be made to adhere, as closely as functional conditions will permit, to the larger range of obtainable tolerances suggested in this paper. In analysis the simple male and female engagements may be solved first; then the surfaces entering only into limited functional trains; and lastly, the surfaces entering into all the functional trains for that component. As the tolerance of each involved surface adds to the final variation accumulated through a functional train, it is generally desirable to shorten these trains as much as possible in the design.

Frequently several components are involved in a functional train; also several different trains may involve a particular component. All of the possible ramifications of these must be traced out and considered. Complete tolerance analysis involves methods of logic beyond the present experience of all but a few individuals. A textbook illustrating the technique suitable for tolerance analysis and specification is needed to disseminate knowledge in this branch.

In analysis, only the limits of the tolerances considered are carried through in the equations. Functional and other requirements must be fulfilled all through a mechanical train by the opposed conditions of maxima and minima. This proof assures that all possible combinations of the involved surfaces, when anywhere within their respective limits, will always satisfy the requirements. It therefore follows that any place within the respective limits will be functionally as satisfactory as any other place within, and no preference need be expressed regarding desirability of machining a given surface to its "high" or to its "low" limit. "Middle of the Limits" is a good slogan for the production departments.

Occasionally in analysis it will appear that one or more functions of the mechanism may be secured only by the observance of tolerances so small as to render prohibitive the cost of interchangeability. In this case the mechanism performing that particular function should be redesigned or changed to one permitting easily obtainable tolerances. If a satisfactory change is not discovered and due decision is made to fix minute tolerances, then the special producing means insuring the degree of precision demanded by such tolerances should be determined and specified. We must not calmly step over such a point and go on hoping that somehow during production the gods will be kind. Increased delay and expense will be incurred if the trouble is not solved at the start. The gods do not especially favor production engineers.

In analyzing tolerances it should be borne in mind that necessary clearance between parts is as definite a function as the required operative contact. This becomes of particular importance in firearms, where the demands of outside shape of the weapon result in the permitted space being almost entirely filled with components. Lack of room must ever be faced by the firearms inventor. In spite of this, and in addition to performing many other functions, the mechanism must sustain and operate under a force of the intensity of about 50,000 lb. per sq. in.

Tolerance Diagrams

Concurrent with tolerance analysis should go the preparation of the necessary diagrams. These should show graphically, for each function, the extreme conditions of contact or clearance resultant from the maxima and minima of the involved surfaces. Basic figures for points of departure should be given. On these diagrams should be expressed the direct limit dimensions adopted for each surface concerned, also, step by step, the accumulating resultant limits through the particular mechanism train considered. The resultant limits should be so marked as to clearly distinguish them from the direct limits. Basic dimensions should carry no limits and are distinguished by a different mark.

These diagrams, with the basic dimensions and figures expressing both direct and resultant limits, are the record sheets of the tolerance analysis. The diagrams should be suitably made and carefully preserved as they represent the history, step by step, of the considerations used in the limit determination. The diagrams, particularly so at first, will be useful during the production of the mechanism. Questions of change in model, tolerance changes, different methods, etc. can be intelligently decided in a short time with their aid. The analysis diagrams with their recorded information will be useful to save duplication of effort and to secure continuity of plan during production, when the designer may be engaged elsewhere. The diagrams, properly made, demonstrate that the respective limits will produce the desired results of function and interchangeability. Faith in the limits is necessary for factory discipline during production.

Requirements of Component Drawings

Component drawings should be made on a sufficiently large scale to permit clear delineation of all surfaces and intersections and to furnish sufficient space for the dimensions. Basic dimensions, suitably distinguished as such, should be entered without limits. The chosen locating points should be clearly shown. The various surfaces should be considered as divided into their proper machining operations during the limit analysis. From the analysis diagrams the adopted limit dimensions necessary to control each operation should be transferred to the component drawing. Resultant limits should not appear on the component drawing.

The contour to be formed by each operation should be dimensioned to provide complete information as to the shape of the cutting tool, and the positions of the essential points in this contour should be given direct to the working points and independent of any other surface. Rare exceptions may be made if a close special relationship is desired between two surfaces formed by separate operations. In this case the standard fixture holding the component is moved on an auxiliary slide to bring one of these surfaces in contact with a fixed stop on the machine platen while machining the other surface. Another exception may be in case of a relatively unimportant surface permitting wide limits; for example, the "run-out" of a mill cut resulting from stopping the cutter in the component. The latter exception permits the use of a very simple gage from the end of cut to the nearest definite "landmark," and should be so specified on the drawing.

The component drawing should carry all the necessary dimensions for the cutting tool and for the gages required to control each operation. Each limit dimension is to be exemplified in gages of some form. Unnecessary dimensions are to be avoided. The positions of the dimensions should indicate how the component is to be located in fixture and gage, and the correct portions of the surfaces to be gaged for the control of each operation. Routine gages to explore the total surface formed by an operation are expensive both to construct and to use. Seldom will this be required.

In the later detailed design of actual fixture and gages for each operation, no departures from the specified method, locating points, and limits should be permitted. If reason for departure can be shown and a change is adopted, it should be incorporated through the limit analysis and the component drawing. The limit-analysis diagrams should correspond in every detail to the methods specified by the component drawings.

Tolerance may be defined as a zone within which the desired surface must wholly lie. The adopted limits bound this zone. Dimensions specify the plane, cylinder, sphere, cone, etc. forming the boundaries of the tolerance zone.

On the component drawings the boundaries of these tolerance zones must be defined to permit one—and only one—construction. As full faith must later be given every dimension, possibilities of misunderstanding must be avoided. Where necessary, explanatory notes should be carried on the drawing.

In producing the class of mechanism discussed, all dimensions are interpreted by gages. The gages are set and checked by reference blocks. Component drawings are not used by the production department. During the tolerance analysis the actual dimensions of both maximum and minimum are necessarily used in computation and are so expressed on the analysis diagrams. The component drawings are primarily used to specify directly the maximum and minimum dimensions for the respective gages. On the component drawings, therefore, all dimensions other than basic and so marked, should be expressed by the actual dimensions specified for maximum and minimum, thus:

$$\longleftarrow \frac{1.346''}{1.338''} \longrightarrow$$

Correct Design for Interchangeable Mass Production Must be Based on a Fundamentally Correct Tolerance Analysis

The correct design of a mechanism for interchangeable mass production must be based on a fundamentally correct tolerance analysis. As this involves a preliminary determination of method, fixture and gage for each operation, it permits balancing various types against each other and the selection of the simplest types of method, fixture, and gage to insure attainment of the result sought in each machine operation.

Every opportunity exists here to save time and money in selecting methods and in building equipment, as well as in production.

The time required to determine and specify a correct manufacturing design is extremely small when compared with the results obtainable. Indeed, these results can be had in no other way. The alternate method of "cut and try" during production is costly and entails many delays. Even then the latter can only approximate the results obtainable by a correct analysis of the design.

In case of war the correctness of knowledge and specification as to exactly what is to be made in ordnance matériel may well be the factor which determines defeat or victory. All plans of organization for mass production may be either vitiated or made successful by the degree of excellence entering into the design of the matériel. In spite of our present satisfactory methods of machining and gaging, the neck of the production bottle lies in badly determined manufacturing design of the components sought.

Attempt has been made in this paper to show the steps required in the preparation of correct manufacturing design. When such designing becomes prevalent the neck now usually choking volume production will become enlarged to the proportions of that in the chemist's test tube. This result, in war or peace, will spell great benefit to industry.

Economic Features of Heat-Exchanger Design

Discusses Factors Determining Economic Area of Heat Exchangers, Particularly as Applied to Oil-Refinery Operations—Presents Graphic Method of Analysis Simpler and More Direct Than the Methods Generally Used

By FRANK L. MAKER,[1] and MAX W. THORNBURG,[2] EL SEGUNDO, CAL.

THE oil-refining industry offers many opportunities for the conservation of heat. Since crude oil in its liquid state cannot be separated into marketable products, it is necessary to convert part of it, by the addition of heat, into the vapor phase in order to separate the various fractions of different boiling points and values. It is then necessary to abstract the heat in the vapor, so as to return it to the liquid phase for further treatment or for sale. The portion which was not evaporated, or "bottoms," may need to be cooled for convenient handling or storage.

One of the most conspicuous advances in oil distillation during recent years has been the practical abandonment of "batch" processes in favor of continuous operation, in which an uninterrupted flow of crude feed stock, or oil to be separated into its fractions, is pumped into the stills, and the finished or partly finished products and residuum are taken out continuously. With this method of operation it is possible to save much of the heat in the vapors and bottoms that was formerly wasted, by transferring it to the incoming feed.

Furthermore, most crude stills are operated at high temperatures; this results in high flue-gas temperatures. In some cases it may be practicable to save some of this heat in the flue gas to make steam or to heat incoming air.

Refinery operations thus offer a broad field for the use of "heat exchangers," which transfer the heat energy from the hotter to the colder fluid without permitting them to mix, the heat circulating in the system.

But heat exchangers mean investment in equipment with its attendant depreciation, operation and maintenance costs, and also, generally, an increase in the cost of pumping the fluids on account of the necessary pressure drop through the exchanger. Their function is to take the heat which would otherwise be wasted, and which must sometimes be otherwise removed at more or less expense, and use it to replace heat which would otherwise have to be supplied by burning additional fuel. The savings in fuel thus made must pay back, during the useful life of the equipment, the original investment and all of the fixed operating charges. This profit will include allowance for the risk of the equipment or the plant of which it is a part becoming obsolete.

The percentage of the total available heat transferred or saved depends upon the design and operating characteristics of the exchanger, the physical properties of the fluids, their quantities, temperatures, velocities relative to the surface, etc.; and where the above factors are fixed, it depends upon the amount of total transfer surface. The *amount* of heat transferred increases as the surface is increased, but not in direct proportion, because as the temperatures of the two fluids approach each other the amount of heat transferred through each increment of area becomes less. The *cost* of the additional equipment, including the additional pumping charges, attendance, etc., increases approximately in proportion to the increase in surface. There is therefore a point beyond which it is not economical to go, and the additional heat saved by increasing the surface beyond this point will not pay a profit considered attractive. On the other hand, if less surface than this is installed, some heat will be wasted which it would be profitable to recover.

The ordinary cut-and-try method of designing heat exchangers is a long and tedious process to determine this economical limit and to compute the area of exchanger surface required. In order to determine this point it is necessary to express the relation between the area and the percentage of the available heat which is transferred, and also the relation between the area and the total charges. The principal object of this paper is to present a simple method of solving these problems, using graphical means.

Assumptions for Calculations

The assumptions made both in the cut-and-try method, and in the more rational method as presented in this paper are as follows:

1 The fluids move in a countercurrent direction
2 The specific heats of the fluids remain constant (or a suitable mean value can be used)
3 Radiation is neglected
4 The heat-transfer factor is constant, or a suitable mean value is used
5 The total cost per year of the exchanger varies with the area in a linear relationship.

Notation

C_h = specific heat of hotter fluid
C_c = specific heat of colder fluid
W_h = weight of hotter fluid per hr.
W_c = weight of colder fluid per hr.
K = $\frac{C_h W_h}{C_c W_c}$ or $\frac{C_c W_c}{C_h W_h}$, whichever is less than 1
CW = smaller of the two products $C_h W_h$ and $C_c W_c$
T_{h1}, T_{h2}, T_{c1}, T_{c2} = initial and final temperatures of hotter and colder fluids
H_1 = maximum heat possible to be transferred from hotter to colder fluid
= $C_h W_h(T_{h1}-T_{c1})$ or $C_c W_c(T_{h1}-T_{c1})$, whichever is the smaller
H = heat actually transferred by a given surface
= $C_h W_h(T_{h1}-T_{h2}) = C_c W_c(T_{c2}-T_{c1})$
A = area of transfer surface of exchanger, sq. ft.
U = heat-transfer factor, B.t.u. per sq. ft. per deg. fahr. per hr.
E = efficiency of heat exchanger
= $\frac{H}{H_1} = \frac{\text{Heat actually transferred}}{\text{Heat available for transfer}}$
Q = $\dfrac{\log_e\left(\frac{1-EK}{1-E}\right)}{1-K}$
V = value of heat saved in dollars per million B.t.u.
B = increase in annual cost, including profit, for each additional square foot of transfer surface
X = load factor = part of year exchanger is in operation
R = $\frac{114.2\,B}{XU(T_{h1}-T_{c1})V}$

Trial-and-Error Methods of Design

The cut-and-try method of designing heat exchangers ordinarily followed usually involves the following steps:

1 *Given Data:*
a Initial temperatures T_{h1} and T_{c1} of the two fluids
b Quantities W_h and W_c of both fluids
c Specific heats (or heat capacities) C_h and C_c of both fluids.

2 *Data Assumed:* The heat-transfer factor U in B.t.u. per sq. ft. per deg. per hr. is assumed from experience with similar exchangers, fluids, and flow conditions. It is modified principally by the velocity and viscosity; and after the design is made it is necessary to check back to see that the working conditions corre-

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spond with those on which the assumed U was based, and particularly that these conditions can be met with a reasonable pressure drop through the exchanger.

3 From the given data a guess is made at the probable final temperature of one fluid, and the corresponding temperature of the other fluid is computed. (The final temperature of one of the fluids may be also one of the given data, as in the case of a cooler for cooling oil from one temperature to another. In this case the quantity of other fluid may have to be computed, as, for example, the quantity of cooling water required. This simplifies the problem.)

4 The mean temperature difference is then computed by applying Grashof's formula

$$T_m = \frac{(T_{h1}-T_{c2})-(T_{h2}-T_{c1})}{\log_e\left(\frac{T_{h1}-T_{c2}}{T_{h2}-T_{c1}}\right)}$$

and the area then computed by the formula:

$$A = \frac{\text{Heat transferred}}{\text{Heat-transfer factor} \times \text{Mean temperature difference}}$$

5 With the final temperatures, size of exchanger, etc. thus assumed and checked, as per step 2, the value of the heat saved per year can be computed and the cost per year estimated.

6 By assuming a number of such temperatures and computing the corresponding areas, it is possible to plot a curve showing the relation between the area and the annual value of the heat saved, and another curve of the relation between the area and the annual cost. A third curve plotted from the difference of these two will show the net return and the area giving the largest net return will be the economical limit.

This necessarily involves a considerable amount of work, so much so that judgment and precedent alone are often relied upon to determine the desirable area and final temperatures.

Presentation of Exact Method

The method presented herewith simplifies this work considerably and may be explained as follows:

The initial temperatures T_{h1} and T_{c1} of the two fluids are generally among the given data, as well as the average specific heats of C_h and C_c and the quantities per hour W_h and W_c.

The hotter fluid cannot be cooled by heat exchange to a lower temperature than the initial temperature T_{c1} of the colder fluid, and the colder fluid cannot be heated to a higher temperature than the initial temperature of the hotter fluid T_{h1}.

The maximum heat that the hotter fluid can lose is:

$$H_h = (T_{h1}-T_{c1})C_hW_h$$

and the maximum heat the colder fluid can absorb is:

$$H_c = (T_{h1}-T_{c1})C_cW_c$$

Since the heat given up and that absorbed are equal, neglecting radiation, the smaller of these two quantities is the maximum heat transferable. We will denote it by H_1. Denoting the smaller of the two products C_hW_h and C_cW_c by CW, the maximum amount of transferable heat will be

$$H_1 = CW(T_{h1}-T_{c1})$$

A given exchanger will transfer only a certain proportion E of this maximum possible amount. This factor E may be taken as a basis for comparing exchangers with identical initial conditions but different areas; it will be termed the "efficiency of the exchanger."

If we further express the relative heat capacity of the two fluids by K,

$$K = \frac{C_cW_c}{C_hW_h} \text{ or } \frac{C_hW_h}{C_cW_c}$$

whichever is less than 1. The following equation can be written for the relation between area and efficiency (see appendix for derivation):

$$A = \frac{CW}{U}\,\frac{\log_e\left(\frac{1-EK}{1-E}\right)}{1-K} \qquad \ldots\ldots\ldots\ldots [1]$$

or, letting

$$Q = \frac{\log_e\left(\frac{1-EK}{1-E}\right)}{1-K} \qquad \ldots\ldots\ldots\ldots [2]$$

$$A = \frac{CW}{U} \times Q \qquad \ldots\ldots\ldots\ldots [3]$$

For the given and assumed data CW/U is a constant for the problem, and Q is then proportional to the area. By assuming different values of K, a series of curves can be plotted showing the relation between Q (or by a change of scale the relation between the area) and efficiency (see Fig. 1). These curves rise rapidly at first and then bend rather sharply to the right, approaching the 100 per cent line, but not reaching it.

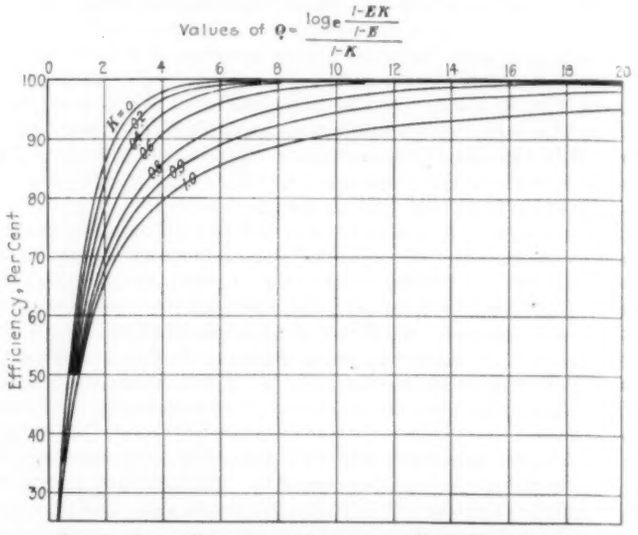

FIG. 1 AREA-EFFICIENCY-CURVES FOR HEAT EXCHANGERS

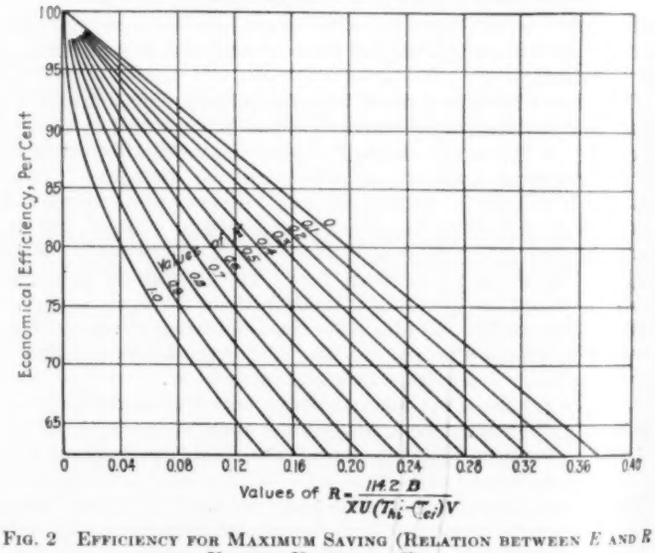

FIG. 2 EFFICIENCY FOR MAXIMUM SAVING (RELATION BETWEEN E AND R FOR VARIOUS VALUES OF K)

On the steep part of the curve a small change in area produces a large change in efficiency, but on the flatter part a large change in area produces a very small change in efficiency. It is evident that there is an area at which the annual cost of an additional square foot of exchanger will be just equal to the value of the additional heat saved, and it will not be economical to go beyond this. The final step in the solution of our problem is to locate this point.

It can be shown that this point may be determined by the equation

$$(1-EK)\,(1-E) = R \qquad \ldots\ldots\ldots\ldots [4]$$

in which

$$R = \frac{114.2\,B}{XU(T_{h1}-T_{c1})V} \qquad \ldots\ldots\ldots\ldots [5]$$

where B = increase in annual cost per sq. ft. of additional surface, including pumping charges and profit
X = load factor = part of year exchanger is in operation, and
V = value of heat saved in dollars per 1,000,000 B.t.u.

It will be noted that the expression for R contains the factors which define the annual cost of operating the heat exchanger, and the value of the available heat—all of which factors are known for any given problem. Substituting these known quantities in Equation [5] gives a value of R for the problem, and this in turn gives a quadratic equation for the economical efficiency [4], which may be solved by substituting in this equation the previously computed value of K.

To simplify these computations further, the chart of Fig. 2 has been devised, giving graphically the relation between E and R for various values of K.

Finally, Figs. 1 and 2 have been combined in the form shown in Fig. 3. This makes a convenient working diagram, the use of which will now be explained by examples.

USE OF CHARTS

The following is the procedure for the use of these charts in solving problems where the area of the heat exchanger is required.

1 Note the data on the fluids:

$$W_c,\ W_h,\ C_c,\ C_h,\ T_{c1},\ T_{h1}.$$

2 Compute $K = \dfrac{C_c W_c}{C_h W_h}$ or $\dfrac{C_h W_h}{C_c W_c}$ (whichever is less than 1).

3 For the type of heat exchanger assumed, assume a heat-transfer factor U, basing it upon the velocity and previous experience with similar type of exchangers.

4 Estimate the increase in annual charges, B, per sq. ft. of additional surface for the assumed type of heat exchanger, and also the value V of the heat saved per 1,000,000 B.t.u.

5 Note whether the service is continuous or not. If it is, X has a value of 1. If in service half the time $X = 0.5$, and so forth.

6 Compute $R = \dfrac{114.2\,B}{XU(T_{h1}-T_{c1})V}$

7 On Chart 2 or 3 find the value of E corresponding to this value of R and computed value of K.

8 On Chart 1 or 3 find the value of Q for this value of E and compute the area

$$A = \frac{CW}{U}\,Q$$

9 Find the final temperatures T_{h2} and T_{c2}, if required. The temperature change of the fluid which has the largest CW is $KE(T_{h1}-T_{c1})$ and the temperature change of the other fluid is $E(T_{h1}-T_{c1})$.

EXAMPLE I. Design a heat exchanger for heating feed stock by hot residuum for the following conditions:

Feed, 5000 gal. per hr. of crude, or W_c = 38,500 lb. per hr.
Residuum, 4000 gal. per hr., or W_h = 32,000 lb. per hr.
Initial temperature of residuum = 500 deg. fahr. = T_{h1}
Initial temperature of feed = 65 deg. fahr. = T_{c1}
Specific heat of both residuum and feed, approximately 0.5
Load factor X = 0.9.

Assume a double-pipe exchanger with total rate of increase in annual charges of \$3 per sq. ft., including profit, and giving a heat-transfer factor U of 35 B.t.u. per sq. ft. per deg. per hr. The heat saved reduces the fuel consumption on the still. With fuel oil at \$1.50 per 42-gal. barrel weighing 8 lb. per gal. and having 18,700 B.t.u. per lb. and taking the furnace efficiency at 60 per cent, the cost per million B.t.u. is

$$\frac{1.50 \times 1{,}000{,}000}{42 \times 8 \times 18{,}700 \times 0.6} = \$0.40 = V$$

With these data we can now find the value of R:

$$R = \frac{114.2 \times 3}{0.9 \times 35(500-65) \times 0.40} = 0.0625$$

The value of K is $\dfrac{32{,}000}{38{,}500} = 0.83$, and from the economical efficiency chart, Fig. 2, or from Fig. 3, for these two values we find E = 80.5 per cent.

Turning to Fig. 1 or Fig. 3, for a value of E = 0.805 and K = 0.83, a value of Q is found equal to 3.1. The required area is now found to be

$$A = \frac{C_h W_h}{U}\,Q = \frac{0.5 \times 32{,}000}{35} \times 3.1 = 1420 \text{ sq. ft.}$$

The final temperatures of the two fluids may now be computed as follows:

$$Th_2 = T_{h1} - E(T_{h1} - T_{c1}) = 150 \text{ deg.}$$

while $T_{c2} = T_{c1} + KE(T_{h1} - T_{c1}) = 355$ deg.

EXAMPLE II. Oil heater using exhaust steam. Oil, 800 bbl. per hr. = 40,000 gal. per hr., or W_c = 312,000 lb. per hr.; specific heat of oil =

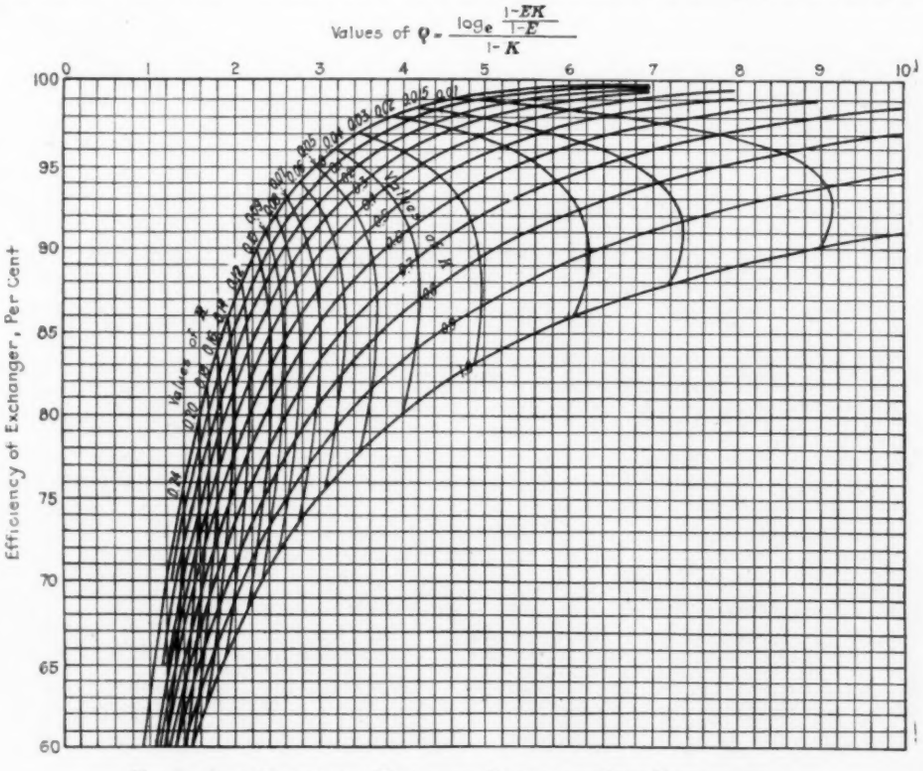

FIG. 3 AREA-ECONOMICAL EFFICIENCY CURVES FOR HEAT EXCHANGERS

0.5. Available steam unlimited at no cost. (In this case where the steam is condensing at constant temperature, the specific heat of the steam as such should not be taken. The quantity CW is rather the total heat given out by the fluid for a temperature change of one degree. In the case of steam condensing at constant temperature this can only be interpreted as infinity, and the value of K is $1/\infty$ or 0.)

B = \$1.80 per sq. ft. Heater is in service, say, 1/3 of time, or load factor X = 1/3. Value of heat saved = \$0.50 per 1,000,000 B.t.u.

$$U = 150,\quad T_{h1} = 212,\quad T_{c1} = 90$$

whence

$$R = \frac{114.2 \times 1.80}{1/3 \times 150(212-90) \times 0.5} = 0.0674$$

and

$$E = 0.9325$$

K being 0. For this value of E, Q = 2.72, and

$$A = \frac{312{,}000 \times 0.5}{150} \times 2.72 = 2820 \text{ sq. ft.}$$

The outlet temperature of the oil will then be

$$T_{c2} = 90 + 0.9325(212-90) = 90 + 113 = 203.8 \text{ deg.}$$

In this case, even though the exhaust steam is valued at nothing, it would not pay to heat the oil to more than 204 deg. fahr. if the heat can be subsequently put into it at \$0.50 per million B.t.u., because of the additional charges and profit required by the equipment. This is a case where the proper temperature could only be determined by economic considerations.

In cases where one of the final temperatures is fixed by the necessities of operation, it will not be necessary to compute R or use Fig. 2 at all. The necessary efficiency can be computed from the temperature relations and

the value of Q found on Fig. 1 directly. Care should be taken, however, to see that operating necessities really govern, and not the dictum of the operator as to what is desirable. An explanation of the economics should in this case bring forth the reason for a variation from the economic area, if it is necessary.

The specific heat as well as the heat-transfer factor are assumed to be constant in this work. Average values should be taken. The error from variation in specific heat will probably be within the limit of the error of the assumptions. In the case of vapors condensing at decreasing temperatures, such as oil vapors, the quantity equivalent to the specific heat should be obtained by computing both latent and sensible heats and dividing by the weights.

Cost of Exchanger and Value of Heat

The cost of the exchanger has been assumed to be a linear function of the area. An installation of any size of heat-exchanger surface will probably be made up of standard units for which an average price per square foot can be estimated. In addition to the standard units there will probably be a setting of some sort and necessary pipe-line connections which will not vary much with the area. The cost can therefore be represented by an equation of the form

$$M = N + BA$$

It will be necessary of course to have an approximate idea of the type of heat exchanger which will be used, in order to make this estimate.

From the first cost of the installation the annual charges should be computed, figuring the life conservatively. To this should be added the estimated annual maintenance and repair charges, the attendance, if any, and the cost of cleaning if this is required periodically. The nature of the fluid will determine whether cleaning is required.

In general a double-pipe exchanger, that is, one having one pipe inside of another, will only be profitable for small quantities with high temperature differences, as this type is relatively expensive compared with a drum containing a number of tubes with the necessary baffles to secure the desired flow condition. This is exemplified in condenser practice where large condensers for steam are of the tube type contained in drums and smaller condensers or coolers, such as ammonia condensers, are of the double-pipe type.

The value of the heat to be taken is not always merely the value of the fuel saved. In some processes, as in condensing vapors, a heat exchanger transferring the heat from the condensing vapor to feed stock might be computed to have an economic area less than that necessary to condense all the vapor if the value of the fuel alone is taken. However, in this case a necessary part of the operation is to condense all the vapor, and if this is not done in the heat exchanger it will have to be done with some sort of condenser. The cost of doing this by some other means can properly be added to the value of the heat saved by the heat exchanger in computing the economic area of the heat exchanger.

In other cases, especially where the heat medium is steam which is generated by an existing power plant, the cost of the steam is generally taken to include all attendance and fixed charges on the boiler plant. However, if the heat exchanger saves only a small part of the steam being generated in the plant, such reduction would probably not lower the operating costs of the boiler plant, as unless this reduction were very considerable the attendance would not be decreased nor the fixed charges, and the only real saving would be practically the cost of the fuel and water.

There may be other cases where the use of heat exchangers may increase the capacity of units to such an extent that it will not be necessary to build additional units which increased demands might otherwise require. In this case the value of the heat should be taken to include the fixed charges and attendance on the equipment, as well as the value of the fuel.

In other cases the temperature of the feed stock may have an effect on the process, the high temperature of the feed stock, for instance, possibly increasing the yield in a process which might be worth much more than the value of the fuel saved alone, and can properly be allowed for in computing the value of the heat to be used in determining the economic area.

These various cases are mentioned to show the necessity of making an engineering estimate of the situation instead of taking the accountant's "cost" figures as a guide.

It should be noted that the life to be taken is not necessarily governed by the heat-exchange equipment itself, as the equipment of which the heat exchanger is an auxiliary may have a shorter life and the salvage value of the heat exchanger may be small. It is well to be conservative in making these estimates.

One point should be noted in regard to the area which will return any given profit on the investment. It is not correct to take the area such that the total net earnings, minus the operating charges, divided by the total investment is equal to the minimum profit. This will be made clear by referring to Fig. 4, where curve ACB represents the rate at which the gross earnings increase as the exchange surface increases, and the straight line AB represents the

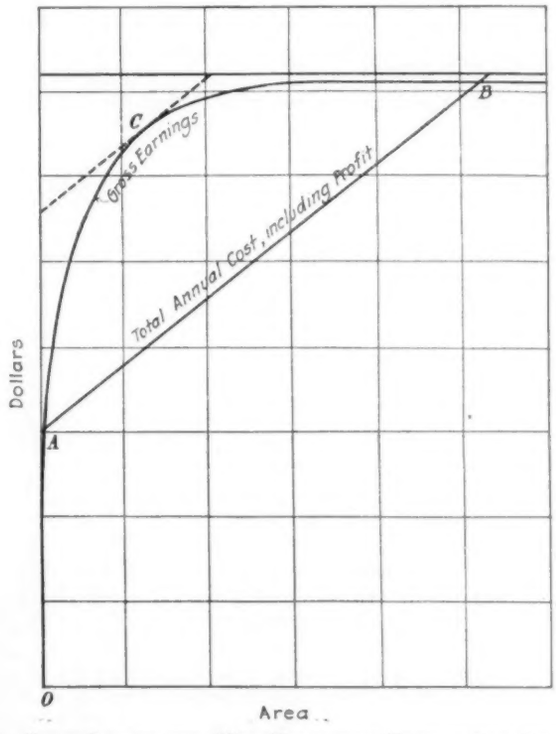

FIG. 4 CHART ILLUSTRATING MOST ECONOMICAL POINT IN AREA SELECTION OF HEAT EXCHANGERS

total annual cost of the exchanger, as the area increases, including the minimum attractive profit. This intersects the earnings curve at two points, A and B, where the total annual earnings are just equal to the total annual charges, including profit. An area less than that corresponding to point A or greater than that corresponding to point B will not return a profit equal to the minimum acceptable. The rate at which the annual cost increases is the slope of the line AB and appears in the formula as term B. Similarly the slope of the curve ACB at any point represents the rate at which the total earnings increase as the area increases. This is very rapid at first but the curve becoming nearly horizontal after bending sharply to the right indicates that the earnings are then increasing very slowly. The large rate of earning of the first area helps maintain the average up to the point B. At point C, where the tangent to the curve is parallel to the line of total cost, the rate of increased earning is just equal to the increased cost, and all additional area beyond this point will not pay the minimum acceptable profit. The point C is determined mathematically in the appendix and gives the maximum area which will pay the charges and minimum attractive profit, although the average return on the whole exchanger will be higher than the minimum profit.

Appendix

The derivation of the formulas for economical efficiency is as follows, using the notation already given:

The initial temperatures of the two fluids being T_{h1} and T_{c1}, it is obviously not possible to cool the hotter fluid below T_{c1} or raise the temperature of the colder fluid above T_{h1} by any transfer of heat between them.

The maximum available heat from the hotter fluid is then

$$H_{1h} = C_h W_h (T_{h1} - T_{c1})$$

and the maximum heat the cooler fluid, can absorb is

$$H_{1c} = C_c W_c (T_{h1} - T_{c1})$$

In general, these two will not be equal and the lesser quantity governs, and the following two cases are therefore to be distinguished:

Case I: $C_h W_h$ is less than $C_c W_c$

Case II: $C_c W_c$ is less than $C_h W_h$

CASE I. Here the maximum heat which can be transferred is determined by the hotter fluid. The hotter fluid could possibly be cooled from T_{h1} to T_{c1}. If it is actually cooled to T_{h2},

$$E = \frac{T_{h1} - T_{h2}}{T_{h1} - T_{c1}}$$

$$\frac{C_h W_h}{C_c W_c} = K \ (K \text{ is less than } 1)$$

$$T_{c2} - T_{c1} = K(T_{h1} - T_{h2}) = EK(T_{h1} - T_{c1})$$

$$T_{c2} = T_{c1} + EK(T_{h1} - T_{c1})$$

and

$$T_{h2} = T_{h1} - E(T_{h1} - T_{c1})$$

$$A = \frac{H}{U} \frac{\log_e \left(\frac{T_{h1} - T_{c2}}{T_{h2} - T_{c1}} \right)}{(T_{h1} - T_{c1}) - (T_{h2} - T_{c1})} \text{ by Grashof's formula,}$$

and since $H = EH_1$, it can be shown that

$$A = \frac{H_1}{U(T_{h1} - T_{c1})} \frac{\log_e \left(\frac{1 - EK}{1 - E} \right)}{1 - K}$$

or

$$A = \frac{C_h W_h}{U} \frac{\log_e \left[\frac{1 - EK}{1 - E} \right]}{1 - K} = \frac{C_h W_h}{U} Q$$

CASE II:

$$E = \frac{T_{c2} - T_{c1}}{T_{h1} - T_{c1}}$$

$$\frac{C_c W_c}{C_h W_h} = K_1 \ (K_1 \text{ less than } 1)$$

and

$$T_{h2} = T_{h1} - EK_1(T_{h1} - T_{c1})$$

$$T_{c2} = T_{c1} + E(T_{h1} - T_{c1})$$

$$A = \frac{H}{U} \frac{\log_e \left[\frac{T_{h1} - T_{c1} - E(T_{h1} - T_{c1})}{T_{h1} - EK_1(T_{h1} - T_{c1}) - T_{c1}} \right]}{T_{h1} - T_{c1} - E(T_{h1} - T_{c1}) - T_{h1} + EK_1(T_{h1} - T_{c1}) + T_{c1}}$$

and since $H = H_1 E$, it can be shown that

$$A = \frac{C_c W_c}{U} \frac{\log_e \left(\frac{1 - EK_1}{1 - E} \right)}{1 - K_1} = \frac{C_c W_c}{U} Q$$

In the expression for the area A thus found for both cases, $C_c W_c / U$ is a constant for the given conditions of the problem, so that Q is proportional to the area. For each value of K a curve can be drawn showing the variation of the efficiency E as Q changes. The computation for these curves presents no difficulty except for the value of $K = 1$, which gives for Q an indeterminate quantity of the form 0/0. By differentiating it can be shown that $Q = E/(1-E)$ in this case.

For a given set of conditions where the total heat available for transfer is H_1, the area required is

$$A = \frac{H_1}{U(T_{h1} - T_{c1})} \frac{\log_e \left(\frac{1 - EK}{1 - E} \right)}{1 - K}$$

If the total annual charges, including minimum profit and pumping, are expressed in an equation of the form

$$M = N + BA$$

where M is the total annual charge, N is a constant, and B is the increase in annual charges for each additional square foot of exchange surface added, then the total annual charges for the area giving efficiency E is

$$M = N + \frac{BH_1}{U(T_{h1} - T_{c1})} \frac{\log_e \left(\frac{1 - EK}{1 - E} \right)}{1 - K}$$

The total value of the heat saved per year, if the load factor is X, is

$$P = \frac{8760 E H_1 V X}{1{,}000{,}000}$$

where V is the value of the heat in dollars per 1,000,000 B.t.u.

The rates of increase of cost of service and value of service as the efficiency is increased are the derivatives of these two quantities with respect to the efficiency, and the value of the maximum economic efficiency is the value which will make these two derivatives equal.

The rate of increase of the cost of service is

$$\frac{dM}{dE} = \frac{BH_1}{U(T_{h1} - T_{c1})(1-K)} \frac{(1-E)}{(1-EK)} \frac{(1-E)(-K) - (1-EK)(-1)}{(1-E)^2}$$

$$= \frac{BH_1}{U(T_{h1} - T_{c1})(1-EK)(1-E)}$$

The rate of increase of the value of service is

$$\frac{dP}{dE} = \frac{8760}{1{,}000{,}000} H_1 V X$$

The economical area will be that at which the rate of increase of the cost of service is just equal to the rate of increase of the value of the service. Equating the two derivatives and transforming the equation,

$$KE^2 - (1 + K)E + 1 - \frac{114.2\,B}{U(T_{h1} - T_{c1})VX} = 0$$

$$E = \frac{1 + K \pm \sqrt{(1+K)^2 - 4K\left(1 - \frac{114.2\,BN}{U(T_{h1} - T_{c1})VX}\right)}}{2K}$$

Representing by R the quantity $114.2\,BN/U(T_{h1} - T_{c1})VX$,

$$E = \frac{1 + K - \sqrt{(1+K)^2 - 4K(1-R)}}{2K}$$

This equation may be easily plotted by putting it in the form

$$R = KE^2 - (1 + K)E + 1$$

and a curve of E against R for several values of K is given in Fig. 2.

Planning the Future Power System

WATER powers may be divided into two classes, run-of-river developments, and those that have storage capacity, either natural or artificial. Large water storage can do much toward insuring a continuous power supply from a given stream, but experience has shown that over a period of years the largest storage capacity is likely to be entirely depleted. A power supply from a steam plant can be practically assured by providing an adequate fuel supply against any emergency that may arise that would interfere with obtaining fuel. If coal is not available from one source, it may be obtained from another. Or if one class of fuel is not available, there is the possibility of changing to another. Therefore, there are a number of courses that may be taken advantage of in an emergency to insure a fuel supply to a steam plant. No such flexibility exists with the storage capacity of a water plant as with a steam plant. For an adequate water supply the changing characteristics of nature must be contended with. For periods of years the supply may always be in excess of demands, then over another period nature may not be so bountiful and an acute shortage may be the result. When such conditions arise, there is nothing that will meet the emergency but adequate steam capacity, as has been the experience in different parts of the country during the last five or six years.

The necessity of steam reserve in large water-power developments has changed the whole economic aspect, not only of making the developments, but also in operation. Where systems covering wide areas of country are interconnected, there may be run-of-river plants in one locality and plants that have storage capacity in another. The peak loads in one area may occur at a different time from those of another, due either to a difference in time or to the characteristics of the load, or both. At the various seasons the rainfall may be different on one watershed from that on another, or the rainy seasons of the different sections may not coincide. Into such a diversity of water-power supply supplemental power must be provided by steam to insure against the effects of protracted droughts. If the steam plants are to give a maximum of service, they must be located at the most logical points.

To take into consideration all the factors and arrive at the most economical solution of the problem will require a careful study, not only of the individual systems, but of the interconnected system as a whole.—*Power*, Nov. 4, 1924, p. 731.

"Manit" System for Measuring and Stimulating Labor Effort

By HASBROUCK HAYNES,[1] CHICAGO, ILL.

The paper describes a system of wage payment and production incentive based on a unit of labor effort known as the "Manit" (man-minute) in which the worker receives a bonus for his production in excess of sixty manits per hour. The system also includes incentives for minimizing spoiled work and a bonus for supervisors.

SLAVERY and serfdom, with no compensation except a scant living ration, was the first step toward commercially organizing human effort. Later, with the freedom of man, "day work" developed so that the laborer could voluntarily hire out at so much per day. As human time became more and more valuable, the hourly basis replaced the daily basis of pay. This took place especially when the hours of the working day dropped from 16 to 14 to 12 to 10, and more recently to 8 hours per day.

Piece work, which dates back to medieval times, was the first attempt to establish an output basis for compensation. This was a modification of contract work to the individual, with an agreed price per piece.

The Halsey premium plan, which guaranteed an hourly wage with a premium for saving time as against past performances, was the next progressive step. This was one of the first time-sharing plans. It was used by Frederick A. Halsey in the late eighties and the early nineties of the last century.

The Taylor differential piece-work system with a low and a high piece rate was the first to have a stop-watch time-study basis for setting the task. It was an important phase of the "scientific management" developed by Frederick W. Taylor, also in the eighties and nineties of the nineteenth century.

The Gantt task with bonus was a forward step made by Henry L. Gantt in the first decade of the twentieth century. He used a guaranteed hourly rate with day work below standard and piece work above standard.

The Emerson efficiency plan of wage payment is a guaranteed hourly rate and a standard time with variable bonus at two-thirds standard time and becoming constant at 100 per cent efficiency or standard. This plan was devised by Harrington Emerson in the early years of this century. The Emerson efficiency scale from 67 to 100 per cent or higher was the first real rating basis for the comparison of different operators and different departments.

The Bedaux premium point system devised by Charles E. Bedaux reverts somewhat to the Halsey premium plan. This system has been developed since the World War. The Bedaux point or "B" is a minute of work including rest and delay allowances, 60 B's constituting an hour of work.

A number of other wage incentive plans have been devised and applied by different engineers from time to time, but possibly these mentioned above are the better known and have been the more widely successful.

The "Manit" System

The "Manit" System is a recent development in labor-incentive methods. It is based on the man-minute as a unit for measuring labor effort. It is an intensive plan which not only measures and stimulates labor effort, but also furnishes the management a complete control of all labor losses. It provides special incentive both to the workers to speed up and to the supervision further to encourage the workers and to reduce delays to a minimum. It is applicable to all classes of manual labor.

Standard times for production performances, established and checked through scientific methods, are expressed in terms of "manits" instead of man-hours, which latter is the customary unit for recording labor effort. A "manit," as employed in this system, is equal to a standard man-minute of work. The regular hourly wage of the worker is not disturbed, but to justify the wage he must produce on a daily average at least sixty manits of work in every sixty minutes of time.

When the manits of work produced in a day exceed the man-minutes of time actually taken, bonuses are paid to the workers and their supervisors according to the excess manits produced. The bonuses to the supervisors (but not to the workers), are charged with the idle minutes of employees waiting for something to do. This idleness may be due to equipment breakdowns, or to no material or orders to work on, or to other causes beyond the control of the workers. Better quality of workmanship is stimulated through manit credits or debits, which act, as the case may be, as quality bonuses or spoilage penalties to the workers.

Labor Time Losses

The accompanying chart, Fig. 1, shows graphically the proportion of labor losses in the average day-work department where the

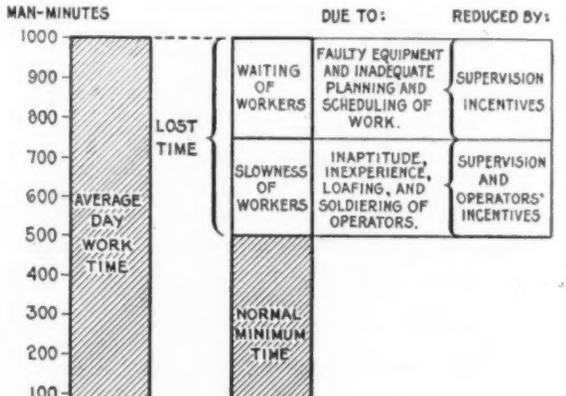

Fig. 1 Labor Losses in the Average Day-Work Department

employees are paid merely for the time they put in, largely irrespective of individual output. From numerous experiences it has been discovered that the average day worker takes about twice as long to do his work as is really necessary without over-exertion. That part of his time which is lost has been found on an average to be divided about equally for various classes of industrial work into

a Waiting time, which is beyond the workers' control

b Slowness, which the worker should be able to correct.

Waiting time, for which the supervision is largely responsible, is minimized through the supervision incentives. Such lost time as this is due to breakdowns of equipment or to no material or orders for the worker to work on.

Slowness, expressed in inaptitude, inexperience, loafing, and soldiering of workers, is largely due to the state of mind of the operator. With proper incentives for him to speed up and with training and encouragement from his foreman this loss is likewise minimized.

Periodically for comparative purposes all labor time losses are converted into labor money losses. Thus every possible means is constantly brought to bear to stimulate labor effort and to reduce labor losses and labor costs to a minimum. As a positive indication of results obtained, labor savings effected are accurately recorded and periodically accumulated.

It has been said that the Manit System has been developed largely on the principle—"Watch the minutes and the hours will take care of themselves." This clearly states the idea, and while it might appear difficult to catch every wasted minute, still, as they are eliminated there are fewer and fewer of them to record.

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Contributed by the Management Division and presented at the Spring Meeting, Cleveland, Ohio, May 26 to 29, 1924, of The American Society of Mechanical Engineers. All papers are subject to revision.

SOME FEATURES OF THE MANIT SYSTEM

The following is a more detailed description of this system:

1 All time standards are expressed in terms of manits, each of which is equal to a standard man-minute of work. A worker must do his work in less time than standard to earn a bonus.

2 All time standards established for each operation or job permit the normal or average worker to make up to as high as a 30 per cent bonus over and above his hourly wage, provided he does his work in as short a time as the normal minimum time. The expert workers can make even more than 30 per cent additional.

3 The normal minimum time for each operation, from which the standard time is calculated by allowing for bonus and the company's share in the time savings after standard, is determined from stop-watch observations of the elements of the work. These observations are confined to the productive or effort time to perform

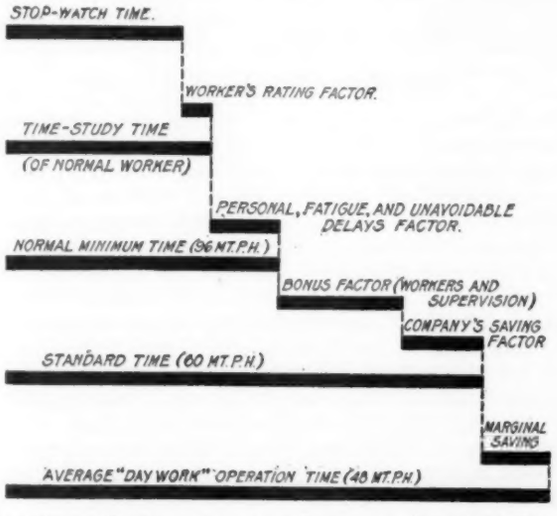


FIG. 2 FACTORS ENTERING INTO THE SETTING OF STANDARD TIMES FOR THE MANIT SYSTEM

the operation. Should the worker studied be faster or slower than the normal worker, the stop-watch time is modified by the observer's rating of the operator with respect to the normal operator. To the normal time-study time thus obtained a proper allowance, according to the circumstances, for fatigue and for personal and other unavoidable delays is added to obtain the normal minimum time. The normal worker should therefore reduce his time on each operation first to the standard time and finally to the normal minimum time.

4 Fig. 2 shows graphically the steps to be taken in setting standards for the Manit System. This refers to a case, as explained more fully later, where the workers and the company share equally in the value of the time saved after standard has been reached—the supervision receiving its portion from the company's share. It will be noted that the day-work time was more than three times the stop-watch time and about twice the normal minimum time.

5 The performances of all employees, gangs, and departments are rated weekly on a manit-per-hour scale, where 60 manits per hour is standard. Therefore at standard the worker must turn out 60 manits of work in 60 minutes of time. From 82 to 96 manits per hour is the normal ultimate—according to the percentages of time saved less than standard time—shared with the employees. The normal ultimate rating corresponds to the normal minimum time. It is the rating at which the worker makes a 30 per cent bonus.

6 In industries where the production conditions are standardized all the value of the savings in time is given to the workers and supervision after reaching and exceeding the standard rating. Where the conditions are unstandardized an equal division of the savings is shared between the company and the workers after the standard rating has been exceeded. In this latter case the supervisor's allotment comes out of the company's share. In each case the supervision's allotment is one-fifth that of the workers, which allotment is merely a fund out of which supervision bonuses are paid, as is later described.

7 The pre-bonus margin in manits per hour that each operation, gang, and department is below the standard rating of 60 manits per hour is accurately determined for several weeks, or months if desired, prior to bonus installation. This is done in order to check the adaptability of the standard times set to seasonable changes of volume and product, and to predetermine accurately the cost margins or potential savings.

8 Waiting time, due to breakdowns of equipment, waiting for material or orders, or to any other causes beyond the control of the workers, is not charged against the bonus time of the workers but only against the bonus time of supervisors.

9 Bonuses are paid to supervisors, such as superintendents, foremen, and gang bosses, out of the supervision bonus fund above mentioned, based on the manit-per-hour ratings of the departments, gangs, or employees directed after deducting waiting-time losses.

10 The normal supervisor has the same ultimate opportunity to make as high as 30 per cent bonus over and above his regular salary that the normal worker has. To attain this amount of bonus he would have to have no waiting time and the employees under him would have to be averaging a 30 per cent bonus, which is equivalent to the normal ultimate rating.

11 To control quality of workmanship, no credit in manits produced is given a worker in calculating his bonus for labor expended by him which fails to pass inspection. To further control quality in extreme cases, the cost of material spoiled (including the labor of preceding operations) converted into manits is also charged against the output of the worker responsible.

12 Where a certain amount of spoiled work seems inevitable, spoilage standards from past performances are established. As these are diminished or exceeded, credits or debits in manits, as the case may be, corresponding to the saving or loss effected are applied to the worker's output in calculating his bonuses. These credits and debits act as extra bonuses or penalties for decreasing or increasing spoilage.

13 All labor losses due to such workers as are performing below standard, to waiting or idle time, and to spoiled work are recorded and periodically converted into money losses. This provides a complete control for planning and scheduling on the exception principle.

14 The time, production, bonus and control records required by the system are handled with slight, if any, permanent additions to the company's regular shop and office clerical force. This is made possible by the simplicity of records, by the reduction in the number of productive workers to be kept track of that are required for the same volume of business, and through the tendency of shop clerks to take a faster gait as the workers about them improve.

15 Net savings in labor cost after installation as compared with pre-bonus cost are recorded weekly and accumulated by departments as direct evidence of financial results obtained.

The Manit System is a comprehensive yet simple plan, first, for accurately measuring labor effort and for checking work standards established against seasonable changes and for cost margins; second, for increasing production and reducing labor costs to a minimum; third, for stabilizing labor and supervision through fairly administered incentives; fourth, for bettering quality of workmanship; fifth, for furnishing complete managerial control of all labor losses; and sixth, for accurately reflecting net savings made.

Utilization of Operating Economies

CERTAINLY there is a need among industrial executives for a broader understanding and systematic application of the economies of industry. There are, as every engineer knows, great opportunities for economies in balancing and in keeping up to date in equipment, in reducing the daily material production wastes, in restricting labor turnover, and in conservation of labor.

There is also a great possibility of economy in organization concentration—the operation of every man from top to bottom toward the definite results for which the industrial unit is aiming. Nor can the more important economies of industry be satisfactorily obtained except through the methods developed by industrial engineering and the introduction of detailed systems, reports, reward plans, production planning and routing, and constant research methods.—B. A. Franklin in *Management and Administration*, September, 1924.

SURVEY OF ENGINEERING PROGRESS

A Review of Attainment in Mechanical Engineering and Related Fields

AERONAUTICS (See also Testing and Measurements)

Pilotless Airplanes

THE author discusses briefly the recent progress in telemechanics, with particular application to the problem of pilotless flight. This latter is of importance both from a military and a pacific point of view. The author points out the effect that would be produced by sending over a large city ten times a day a fleet of 300 pilotless planes, each capable of dropping a ton of explosives or asphyxiating gases. The cost of the necessary equipment would be reasonable considering the effect produced, while the danger to the operators would be practically nil.

In times of peace pilotless airplanes would be of value for long-distance flights such as the "Cape to Cairo," or that from New York to London. Here pilotless airplanes used for the transportation of mail would be capable of rising to immense heights, so great, indeed, as to make pilot flight impossible. There is good reason to believe that winds of very high velocity prevail at extreme altitudes, so that the planes would be capable of developing speeds relative to the ground of the order of 400 m.p.h. Here again such speeds could hardly be used with human pilots aboard, because of the extreme discomfort that they are apt to produce.

The author considers the question of pilotless flight, i.e., flight governed from a distant source by radio waves, as essentially solved. The problem of interference, either accidental or deliberate, has been essentially eliminated by employment of so-called selectors. The selectivity of waves has already reached such a stage that, according to a report of General Ferrié, a boat controlled at a distance from an airplane flying above it was sent crashing (imitating a torpedo) against the sides of a cruiser whose officers were informed in advance as to what would happen and did their best to put the wireless control of the boat out of commission by the cruiser's own sending.

The next question is in regard to the stability of the pilotless airplane in the air. This problem the author considers to have been solved by the invention of the Sperry gyroscope stabilizer, three such stabilizers being used on pilotless planes. The next problem is automatic control of the plane in starting. Here there is first a danger of excessive "zooming," which would bring on a crash. The next danger is that the plane might attempt to rise before it had developed sufficient speed, which likewise would result disastrously. Anemometric apparatus interconnected with the gyroscopic stabilizers is introduced to obviate this danger. The devices are arranged in such a manner that the plane cannot be set for rising until it has attained the proper speed. To insure safe landing a landing "leg" about 6 ft. long is used, which touches the ground as the plane comes down, cuts out all contacts, shuts off the gas, and progressively puts out of commission the various stabilizing devices. Moreover the arrangement is such that all of this takes place not suddenly but with a sufficient lapse of time so as to obtain a smooth landing. Upon this latter being effected, automatic brakes come into action and stop the plane within roughly 100 yd.

At distances not in excess of, say, 20 km. (12 miles), when it was assumed that weather conditions would remain during the period of flight without change, pilotless airplanes have been sent out controlled exclusively by horo-barometric devices. A schedule of flight was set and adhered to without any intervention by the passenger who carried on the experimental plane merely to protect it from accidents. For example, the following schedule was worked out. The plane was to fly north for 5 min.; then northeast for 4 min.; rise to a height of 1200 m. (4000 ft.); drop bombs at a predetermined moment, and then return to the starting point. In this case the plane was controlled by a clock-operated perforated ribbon governing the operation of the various motors.

The author closes by a somewhat significant remark. "The pilotless airplane offers universal possibilities of a value beyond the scope of imagination. But one has to pay for everything one gets, and here there is offered the menace of a merciless and terrible aerial bombardment, unless indeed secrecy is preserved as to devices that would give France preponderance in the air." (Edmond Marcotte in *Arts et Métiers*, vol. 77, no. 45, June, 1924, pp. 210–214, *dg*)

AIRCRAFT ENGINEERING

Light-Plane Competition at Lympne

THE light-plane competition at Lympne was conducted in a manner which was considered by the participants and the English technical press as extremely and, many believe, unnecessarily severe—so severe, in fact, that quite a number of planes were eliminated in the preliminary trials. Nevertheless nine planes participated in the final and hardest event, the speed trial.

As complete information in regard to the various trials and performances of the entrants is given in the original papers from which this abstract is made, only certain conclusions reached from the consideration of these facts will be reported here.

The tests have shown that the light-plane problem is essentially an engine problem, and the best results were obtained by the planes equipped with the Bristol Cherub engine. While this engine required very careful nursing like all other engines, it was stated that with another year of development work it will give 40 hp. and be as reliable as any high-powered aero engine.

It would appear that there are two ways to attack the light-plane engine problem. One is to go on developing the 1100-cu. cm. high-speed engine until reliability combined with low weight and high power is attained. Another way is to go for a larger engine, say, a 2000-cu. cm., and to limit the piston speed.

The tests were of a character to show clearly what the engines could do. In the take-off test the planes were required to show the shortest distance it would take them to clear a 25-ft. barrier. The prize was taken by a plane which did it after a run from standing start of only 215 yd. In the alighting tests in which the machines were required to clear a barrier 6 ft. high and pull up in the shortest possible distance, the best-performing machine came to rest 66.7 yd. from the barrier. In the low-speed test the slowest machine flew at a speed as low as 37.22 m.p.h. In the high-speed test only two machines were able to finish, the rest having failed because their engines would not stand the strain of doing two sets of five laps each, the greatest top speed having been shown at 70.11 m.p.h. (*Flight*, vol. 16, no. 41/824, Oct. 9, 1924, editorial pp. 647–648, and general article, pp. 650–659, illustrated; and *Aeroplane*, vol. 27, no. 15, Oct. 8, 1924, pp. 338–350, illustrated, *dg*)

ELECTRICAL ENGINEERING (See Railroad Engineering)

ENGINEERING MATERIALS (See Metallurgy; Machine Shop)

FUELS AND FIRING (See also Motor-Car Engineering)

Efficient Methods for Burning North Dakota Lignite for Steam Generation

DATA of experiments carried out at the University of North Dakota steam-heating and electric plant, using North Dakota lignite for fuel. The article deals mainly with two methods: the burning of pulverized lignite in suspension, and the burning of raw lignites on non-sifting grates.

Most of the lignites in North Dakota are woody in structure and brownish black in color. They are relatively high in moisture and low in ash content, while the combustible matters are about equally divided between fixed carbon and volatile matter, with the sulphur content usually very small. The heating value is relatively low when calculated on the wet basis, but moisture-free or even air-dried lignites have relatively good B.t.u. values.

Physically the lignites are easily handled. They crush readily in a single-roll crusher, and after crushing they may be conveyed and stored without any particular difficulties. In air drying the larger lumps split up into thin slabs and become quite fragile, so that probably the best size for economical handling for power-plant purposes is a 4-in. or smaller. This may be further crushed at the plant to any required smaller size, as determined by the method of stoking and load conditions on the boiler.

North Dakota lignite on being exposed to heat does not coke, but disintegrates and crumbles to a fine dust, which, when burned on a grate, offers high resistance to air flow and renders uniform fuel bed and air distribution very difficult. Unless great care is exercised in controlling the thickness of the fuel bed and the air pressure, a considerable amount of the fines may be blown through the boiler setting unconsumed.

As regards the use of non-sifting grates and mechanical stokers, the author points out that the improved non-sifting grates cost about twice as much as the common grate. These grates are used in connection with the sprinkling-type stoker or coal feeder, which is relatively cheap to operate, reliable, and fairly efficient, and therefore suitable for small plants. In general, it is said that any non-sifting, forced-draft overfeed stoker that offers little or no agitation to the fuel bed has a good chance in burning North Dakota lignite satisfactorily. Certain conditions as to thickness of bed, size of coal, and draft requirements have to be observed.

The possibilities of utilizing North Dakota lignite in pulverized form are next considered, and the author comes to the conclusion that for the smaller plant the unit system where the coal is burned as it is pulverized without storing is the most economical.

The author proceeds next to the discussion of the burning of the pulverized fuel and states the results obtained with an experimental unit. He comes to the conclusion that lignite when dried to 10 and 12 per cent and pulverized approximately to 40 per cent through a 200-mesh screen is an ideal fuel for burning in suspension. The high content of volatile matter with this moisture reduction and the somewhat fibrous nature of the lignite as compared to the granular appearance of bituminous particles make for freedom of combustion. The increased heating value of the dried lignite also recommends this coal as a fuel for steam production. The original article contains a table giving the average results of a study of the combustion jet along a horizontal plane. (Geo. B. Wharen, Mem. A.S.M.E., Professor of Mechanical Engineering, University of North Dakota, in *The Quarterly Journal of the University of North Dakota*, vol. 14, no. 4, June, 1924, pp. 365–382, *e*)

INTERNAL-COMBUSTION ENGINEERING (See also Shipbuilding; Motor-Car Engineering)

Diesel Engine with Airless Injection and Precompression Chamber

THIS article first concerns itself with a description of the Deutz motor with airless injection. With horizontal motors the system originally used gave satisfactory results, but only indifferent results were obtained when the same system was applied to vertical motors, in which the path of the fuel jet previous to its reaching the cylinder appears to have been too short. The remedy for this was found in providing the cylinder with a recess, usually of a hemispherical shape.

The performance of the engine as finaly developed appears to be quite satisfactory. With fuel having a heating value of 10,000 cal. per kg. (18,000 B.t.u. per lb.) and a load of 360 hp., the fuel consumption per effective horsepower-hour was 224 grams (0.492 lb.) at one-quarter normal load, 168 grams (0.369 lb.) at three-quarters normal load, 167 grams (0.367 lb.) at full load, and 177 grams (0.389 lb.) at 25 per cent overload.

This fuel consumption would indicate a thermal efficiency at full load slightly in excess of 38 per cent. Furthermore this type of engine presents the advantage that its fuel consumption is to a large extent independent of the load; for example, between half-load and 25 per cent overload the consumption varies less than 7 per cent. A good deal of the credit for the performance of the motor belongs to the hemispherical shape of the combustion chamber, which is practically uniform and offers but little cooling surface; hence the high thermal efficiency, to which the motor adds the advantage of a very high mechanical efficiency—estimated at 85 per cent. Tests carried out by Professor Mayer of Stuttgart show the engine to have considerable flexibility and the ability to carry overloads running as high as 40 to 50 per cent.

The other engine type described is shown in part in Fig. 1; its characteristic feature is that it is provided with a precompression chamber, which is a chamber of comparatively small volume into which a charge of combustible is delivered and ignited spontaneously as a result of compression. This compression, accompanied by a certain amount of combustion, forces a considerable amount of burning fuel into the main combustion chamber which is joined to the precompression chamber by a passage *O* of proper shape and

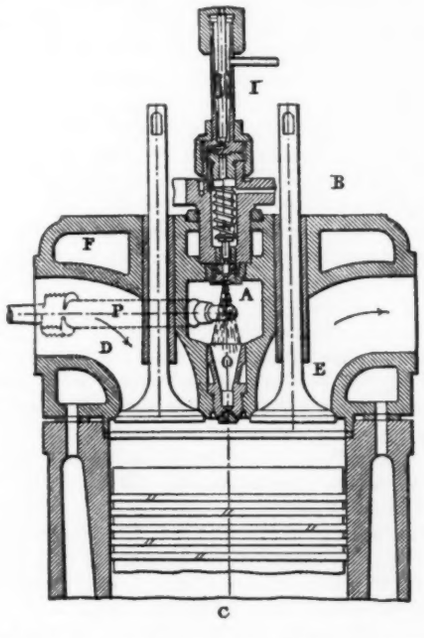


FIG. 1 UPPER PART OF THE CYLINDER OF A DIESEL ENGINE WITH AUXILIARY PRECOMPRESSION CHAMBER

of gradually decreasing section. This transforms the pressure into velocity, and the impetus given to the fluid fuel in its passage from one chamber to the other insures nebulization. It would appear therefore, that the purpose of the precompression chamber is to attain automatically the same results that are secured by the use of compressed air in the ordinary Diesel engine.

As shown in Fig. 1, the precompression chamber *A* opens into the passage *O* with its tapering section. This precompression chamber is cast into the head *B* of the working cylinder and is located between the inlet valve *D* and the exhaust valve *E*. It is, however, also protected by the water cooling jacket *F*, with the exception of the bottom wall where it joins the delivery passage *O*. In its upper part it is equipped with an automatic needle valve located axially to the system *AO*, and the passage *O* to the working cylinder *C* is located in the same axial direction. On the outside the body containing the delivery passage *O* is provided with fins the purpose of which is to retard the flow of heat toward the water-cooled surfaces in the cylinder head. All this causes the precompression chamber to rapidly attain a high temperature, and the jet of liquid fuel when it strikes the hot walls of the delivery passage *O* is made ready for complete combustion equally as well as is the fuel striking the hot wall of a semi-Diesel motor. To start the engine cold the fuel in the precompression is ignited by a roll of nitrated paper *P*. (Prof. Adolf Nagel before the World Power Conference in London, abstracted through *Le Génie Civil*, vol. 85, no. 15, Oct. 11, 1924, pp. 318–319, 2 figs., *d*)

MACHINE SHOP

The Working of Stainless Steel

AN EDITORIAL based on an address by Miss C. Griff, managing director of the Stainless and Non-Corrosive Metal Co., of Birmingham, before a conference of engineering societies held at Wembley.

It would appear from this that while the brands of steel used for cutlery are hard, other brands soft enough to machine are being developed. Even these, however, are not yet always easily machinable, though the blame should not always be placed on the material. An example is cited of a large iron casting which had defied numerous high-speed tool steels to remove its skin expeditiously, until finally a special 18 per cent tungsten tool steel was tried, when a good cut was taken without trouble. It is claimed that had this casting been of stainless steel it would have been condemned as impossible to machine.

Experience in nearly every process of working stainless steels has been gained in connection with the making of an article so simple as a can opener. For this purpose it was decided to use the "Immaculate" brand for the $^1/_4$-in. square top portion, cutting it for the full lengths for the tang and milling the required taper. The idea of forging this out, in order to save material, was tried, but it then required too much heat treatment to get it back to as good a condition for working as it was in previous to forging. Therefore it proved more economical to use more steel than to forge the tangs from short lengths. Provided high-speed drills and cutters are used, no trouble has been experienced in milling and drilling the $^1/_4$-in. square rod as received from the mills.

With regard to the working of stainless-steel sheet, this has been tried for trays and weighing-machine pans. Some sheet rolled down to 28 S.W.G. was stamped and beaded as if it had been tin, without any sign of cracking at the bend. Then came the problem of the removal of scale and the bottoming of the pits in polishing, and it was found that to use cold-rolled sheets was the only satisfactory method. It is stated that in 75 cases out of 100 it is cheaper to pay the extra cost for cold-rolled sheet, for, besides lessening the costly process of polishing, it eliminates the risk of subsequent corrosion. Pickling can sometimes be substituted for cold rolling; it is much less costly, approximately only 1d. per lb. extra on the black hot-rolled-sheet prices.

Incidentally, it may be mentioned that the Stainless & Non-Corrosive Metal Co. allow 15 to 25 per cent more for labor on stainless steel than for the working of mild steel. (*Machinery* (Lond.), vol. 25, no. 627, Oct. 2, 1924, p. 8, *p*)

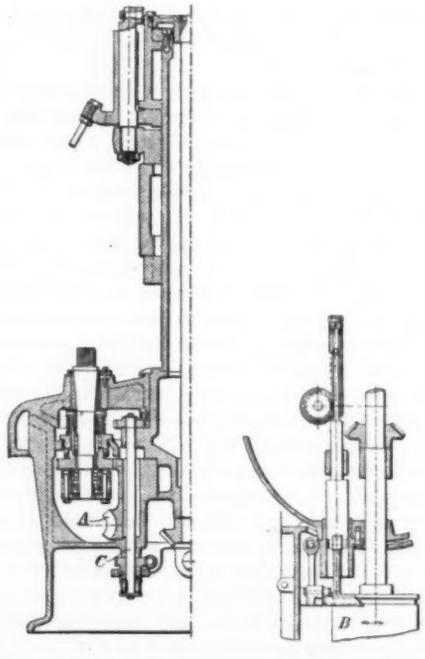
MACHINE TOOLS

The Ryder Automatic Vertical Chucking Machine

DESCRIPTION of a new vertical automatic machine for chucking work, shown by Thos. Ryder & Son, Ltd., of Bolton, England, at the Wembley Exposition. The machine accommodates six chucks, on five of which work proceeds simultaneously, the sixth being idle so that the operator may remove the finished piece and chuck in a new one to be machined. The tool will take pieces up to 4 in. by 6 in. The machining is done by five heads on the center turret and two traversing slides. The tool-holding arrangements allow of a wide variety of operations, but all work is done normally at one speed. Change gears, however, enable this to be varied, and in addition it is possible to secure reduction of speed for tapping, etc. by revolving the tap holder; this requires a special gear which normally does not form part of the machine.

The tool has a large revolving table mounted on a box base, with the traversing slides on each side as described above. The table carries the six chucks which hold the rotating work, and is indexed around the center column or turret. The column carries a heavy sleeve on which tools are mounted to correspond with five positions of the work, and the sleeve is fed up and down by a large revolving cam drum at the head of the column. The main drive is by single belt pulley through change and worm gears to a horizontal shaft carrying a worm in mesh with a large wormwheel. This worm is carried on a sleeve mounted on a large boss forming part of the base. At its upper end the sleeve is cut with a spur ring which meshes with wheels on the six chuck spindles. The table is umbrella-shaped so that it clears quickly of chips, while the manner in which it projects over the sides of the base effectually protects the working parts in the interior. During operations the table is stationary; between operations it is indexed from one position to another.

The indexing motion is shown in plan in Fig. 3, and, in elevation, part of it may be seen in Fig. 2. Taking these together, a revolving drum *B* is utilized to time, by means of a face cam on its end, the stroke of a plunger, an extension of which carries a guided rack. This rack is in mesh with gear wheels on the small vertical shaft *C*, Fig. 2, and the motion imparted by the rack is then transmitted to a pinion immediately under the table. This is in gear with a ring fixed to the table center, and the table is thus caused to revolve. The vertical spindle *C* is provided at its lower end with a ratchet gear, so that the rack stroke is only effective in one direction. Working in conjunction with this rotary table motion is the locating and locking device shown in Fig. 3. A cam on the same drum drives this gear also, being timed to depress the horizontal arm of a bell-crank lever, which motion in turn withdraws



FIGS. 2 (LEFT) AND 3 (RIGHT) INDEXING GEAR OF THE RYDER VERTICAL AUTOMATIC MACHINE

a locating plug and lock from its socket in the table. The lock is spring-loaded and on release shoots into the next table socket as it comes around. The lock and sockets are of nickel-chrome steel hardened.

The principal operation motion is the drive for the traverse of the large sleeve forming the tool slide on the central column described in detail in the original article. This includes a cam which provides for the lowering of the slide and for its subsequent return to its highest station. During the complete revolution of the table the chuck spindles revolve constantly except when each is brought to rest in turn at the last or first station to give the operator a chance to remove the finished pieces and insert fresh ones as the chuck arrives at this point. The chuck spindles are driven by their gears through spring-loaded compound friction and positive clutches. As the spindle approaches the chucking station these clutches are opened by means of cam plates fixed to the body which lift the clutches clear due to flanges, with which they are fitted, running up inclines. The spindle is then stopped and the piece can be removed and replaced. When the rotation of the table is continued the double clutch is lowered again into gear, the friction first engaging and the positive clutch following this up shortly afterward. (*Engineering*, vol. 118, no. 3064, Sept. 19, 1924, pp. 399–400, and a plate of drawings, *d*)

British Centerless Grinder

DESCRIPTION of a centerless grinder built by the Birmingham Small Arms Tools, Ltd., of Sparkbrook, Birmingham, differing

materially from the centerless grinder made in this country by the Cincinnati Milling Machine Co. in that the latter makes use of the periphery of the wheel and the other of the fly face of a cup wheel.

In this machine, as stated, a single cup wheel is employed and the work is supported by a roller steady between two blades. A drawing of the grinding wheel and spindle is given in Fig. 5, while Fig. 4 illustrates the work holder. The spindle is carried in bearing rings which are split in one place and adjusted by expander bolts to the desired degree of fit. They are lubricated by ring oilers. The spindle thrust is taken on a bearing consisting of a set of alternating steel and phosphor-bronze plates. At the back end a ball thrust bearing and compression spring is furnished. Sight-feed lubricators supply the ring-oiler wells. Two sizes of machines are made, for 16-in. and 12-in. wheels, respectively. Fig. 5 shows details of the larger. The smaller head is somewhat simplified and the pulley is at the end of the spindle.

In this machine the work is traversed across the wheel face as the result of tilting the work holder. For a coarse feed the tilt is considerable, while for a fine feed for finishing the tilt is slight. The maximum inclination possible is 10 deg., but in practice 3 deg. serves for most purposes, reduced to a minimum for finishing. The roller of the work holder is driven through a telescopic shaft by belt from the pump shaft at the back of the machine, and its speed can be varied to suit different diameters of work. The supporting blades are beveled and are set for the work to project just far enough to be ground without the wheel's touching the plate faces. The wheel is fitted with a diamond truing device, by which a point is traversed across the face, which in the 16-in. wheel is 3 in. wide, and for the 12-in. wheel, $2^1/_2$ in. wide. In the larger machine pieces from $^1/_4$ in. to $1^1/_8$ in. in diameter and $6^1/_8$ in. long can be ground by the use of two sets of work-holder blades, while in the smaller two sets of blades make it possible to grind work from $^1/_8$ in. to $^3/_4$ in. diameter by $4^1/_2$ in. long.

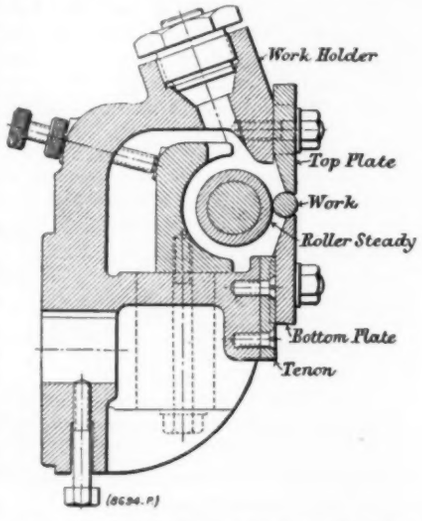


FIG. 4 WORK HOLDER OF COVENTRY CENTERLESS GRINDER

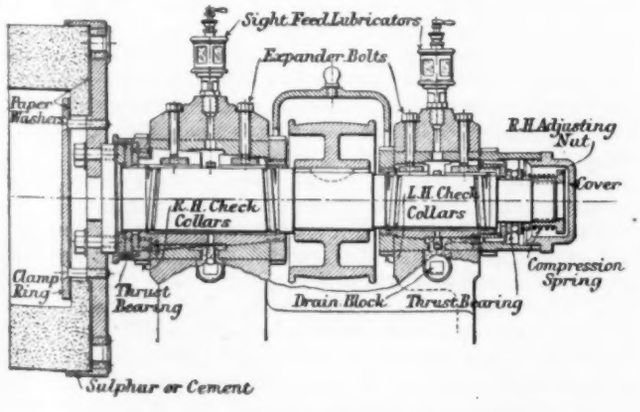


FIG. 5 COVENTRY CENTERLESS GRINDER

For such work as small rollers, gudgeon pins, and other cylindrical parts it is claimed that the time can be cut down with these machines to one-quarter or one-sixth of that for center grinding. (*Engineering*, vol. 118, no. 3064, Sept. 19, 1924, pp. 404–405, and plate of drawings, *d*)

Cutting Tools Made of Cast Iron

WHEN only a few pieces are to be turned to a special form it is sometimes possible to cut down the tool expense and still obtain satisfactory results by using chilled-cast-iron tools. A forming tool of this kind provided with a shank that can be gripped in an ordinary tool post is shown in the original article. The upper surface of the formed part of this tool is made very hard by chilling when the mold is poured. When carefully sharpened a tool of this kind which has been properly designed will give good service for a short time, especially in cutting through scale or the tough outer skin of castings. It also gives exceptionally good results in machining phenolic condensation products, which are very hard on steel tools.

In casting it a detachable rectangular piece or print is used, made about 1 in. deep, 1 in. wide, and 3 in. long. This piece has a slight taper or draft which permits it to be easily withdrawn from the mold. A piece of cold-drawn steel 1 in. square by 3 in. long is placed in the cavity left in the mold by the withdrawal of the print. The hot iron flowing into the mold strikes the "chill" and is thus cooled suddenly. The surface that is in contact with the chill becomes glass-hard if kept in contact until fully solidified.

A tool made in the manner described can sometimes be hardened if heated to a bright cherry color and quenched in water. It is, however, difficult to quench the work at exactly the right point, and furthermore the edges of tools made in this manner are very brittle and easily nicked.

The original article contains certain practical instructions for making such tools. (*Machinery*, vol. 31, no. 2, Oct., 1924, pp. 129, 1 fig., *p*)

MARINE ENGINEERING (See also Power Plants)

Air-Jet-Propelled Launches

BRIEF description of the Schroeder system, which consists essentially of a ship propelled by air ejected below the water line. It is to be applied on a 35-ft. launch for which tenders have been invited by a British engineering firm.

Underneath the ship is a series of grids perforated in such a way that the jets of air, which in this case are being forced through them by a Sturtevant blower driven by a 3-hp. internal-combustion engine, are expelled up under the rising floor which forms a sort of double tunnel astern. It is expected that the air will be expelled at the rate of about 23 m.p.h. and the vessel propelled at the rate of 8 or 9 m.p.h. The system is proposed especially for shallow waters. (*Shipbuilding and Shipping Record*, vol. 24, no. 15, Oct. 9, 1924, p. 431, 1 fig., *d*)

METALLURGY

Influence of Sulphur, Oxygen, Copper, and Manganese on the Red-Shortness of Iron

THIS investigation was undertaken in order to throw light on some disputed matters as to the elements in iron which cause it to be brittle when worked in a forge or otherwise above a red heat. Sulphur is generally admitted to be a cause of this defect, but data as to the minimum percentage of this element necessary before red-shortness disappears are rather meager. Oxygen has been considered by many metallurgists to be as important in this regard as sulphur. The opinions on the effect of copper are quite variable. Manganese is conceded generally to be a corrective for the red-shortness caused by sulphur, and is thought by many to prevent or help prevent the red-shortness supposed to be caused by oxygen. Data as to the amounts of manganese to be used are given in the literature on the subject, but are in some cases contradictory.

Much of the discrepancy in views regarding the effects of some of these elements is due to studies having been made on commercial steels in which it is difficult to insure that the element or elements studied are the only important ones present. This investigation has therefore been made using electrolytic iron or commercially pure iron as raw material. The melts were small (900 gr. approximately) and made under fairly good control in carbon-helix vacuum furnaces or in a high-frequency induction furnace under air. The copper added was over 99.9 per cent pure and the manganese over 98 per cent. The carbon content of the samples in most cases did

not exceed 0.06 per cent. The ingots were forged to $^1/_7$-in. bars and then tested for red-shortness by bending back and forth over a blacksmith's anvil in a temperature range of 1100 to 500 deg. cent. (2012 to 932 deg. fahr.). Samples classed as free from red-shortness were those which stood such a test without breaking.

The conclusions of this study are:

1 Sulphur is the principal element responsible for red-shortness. In order to prevent red-shortness in iron not more than 0.01 per cent sulphur should be present.

2 Oxygen in amounts up to 0.20 per cent does not cause red-shortness in pure iron if the sulphur is below 0.01 per cent.

3 Manganese may prevent red-shortness in iron when present to the extent of three times the sulphur percentage if the oxygen percentage is not above 0.04 per cent.

4 The presence of considerable amounts of oxygen in irons (0.10 per cent and above) tends to reduce the efficiency of manganese in preventing red-shortness. The hypothesis is advanced that this is because some of the manganese reported in such irons is present as oxide.

5 Copper (0.05 to 0.5 per cent) is of minor importance in its effect on red-shortness of pure iron, but in some of the specimens described in this paper it tended to decrease the red-shortness. (J. R. Cain in *Technologic Paper of the Bureau of Standards*, vol. 18, no. 261, July 30, 1924, pp. 327, 335, 5 figs., *ep*)

MOTOR-CAR ENGINEERING

Producer Gas as Motor-Truck Fuel

A description of a number of European devices for operating motor trucks on producer gas, of which only two can be described here on account of space limitations.

The Etia gas producer operates on charcoal with steam injection and is an improvement on the Parker producer. Among other things, it is so designed as to contain enough fuel for several hours, and also has a charging hopper. The ashpit of the generator supports the whole apparatus and is a sort of a circular casing. Inside it is formed by a double perforated cone. Above it is the furnace, a hearth lined with graphite, which insulates it from the air. This furnace is surrounded by a metal sheet provided with passages to permit the entrance of the air of combustion. In the lower part are located the grate and ashpit, the former being capable of oscillating and rotating. The gas produced goes into a device which frees it of dust and into a cleaner designed with the special view to lightness. These apparatus are formed of two sheet-iron cylindrical bodies, one enclosing the other. The gas descends into the annular space between the two apparatus, passes the lower part while it is rising and goes into a pipe which leads to the cleaner and washer. The air of combustion in its turn passes through a nest of tubes which cross the heat recuperator.

The washer consists of a bed of coarse gravel placed on a perforated sheet or special grate and the gas is forced to pass through it in an upward direction. The perforated sheets break it up into fine bubbles which insures good cleaning, while the entrained water is retained in the gravel bed. The gas producer operates with the assistance of the steam which is added to the air admitted to the generator. This steam is provided by a little furnace incorporated into the dust eliminating apparatus (Fig. 6).

Among the other apparatus described in the article (Autogaz, G. P. A., Lion, Imbert, and Berliet), the Renault unit deserves particular mention both because of its construction and also because of the company that stands back of it. In this case the apparatus consists of three parts: a furnace, a gas suction chamber, and a fuel reservoir.

The furnace is of a portable type and consists of a sheet-iron case connected with the suction chamber by four bolts. Inside it is provided with eight elements made of refractory brick, the edges of which have angular tongues and grooves so that the pressure produced by the bolts which hold the unit together forces the bricks against each other and insures the airtightness of the furnace even though no mortar is used. Instead, a sheet of asbestos board is placed between the bricks. Because of this construction the furnace can be installed or dismantled very easily.

Beyond the furnace is located a cast-iron grate capable of oscillation on three supports, which permits its rapid cleaning.

A centrifugal gas cleaner is used. This consists of a turbine fan, the gas entering at the center and being carried to the periphery where it acquires a high circumferential velocity which, in turn, throws all foreign matter, even the finest, against the outer wall. The matter which is projected against the wall is carried off by a small stream of water properly projected. The injection of water produces also a freshening action on the gas and a precipitation of any tarry matter it may contain. The gas comes out of the apparatus through a hole located along the central axis of the device, which prevents foreign matter from coming back with it.

Notwithstanding the efficiency of the cleaner and the great care taken, a certain amount of dust is carried along by the gas and ultimately reaches the motor. Some of this dust is carried out with the exhaust, but the rest gets caught in the lubricating oil and this, if not attended to, will result in rapid wear of the engine parts. To prevent this the engines are equipped with an oil regenerator which forms an indispensable part of the gas-producer-motor prime mover. This regenerator consists of a vessel rotating at a very high speed, 4000 to 5000 r.p.m. The oil arrives from the oil pump at the center of the vessel and is conveyed to the periphery where the

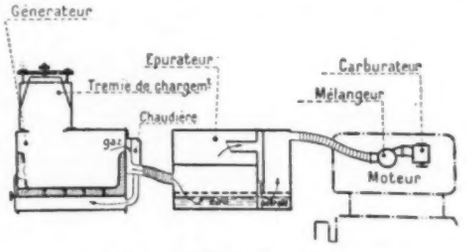


Fig. 6 Autogaz Gas Producer

(*Generateur* = producer; *chaudiere* = boiler; *tremie de chargement* = charging hopper; *epureteur* = cleaner; *melangeur* = mixer; *eau* = water; *petrole* = gasoline.)

circumferential velocity is at a maximum. The foreign matter is eliminated by centrifugal action.

The operating characteristics of producer-gas engines were rather discouraging at first because of the reduction of engine output as compared with gasoline engines of the same size and trouble from dirt on spark plugs and cylinders due to the presence of dust in the gas. The former was obviated by resorting to an increase in compression ratio, and the latter by a better cleaning of the gas and by oil regeneration. Heat recuperation from gas coming out from the producer makes it possible to employ high temperatures, which permits increasing the hydrogen content in the gas, while the heat economy brought about by recuperation makes producer operation at high temperature feasible and economical.

A car equipped with such apparatus (Autogaz) has been in operation for two years in Morocco doing regular work and carries an Arabic inscription which, translated, reads, "Transportation from Casablanca to Marrakech, by the Grace of God." A small 18-hp. car has been running for a year in Madagascar, making regular trips of 50 kilometers (31 miles) with numerous stops. Other instances where gas-producer-operated motor cars exhibited satisfactory reliability and operation are cited. (E. Weiss in *La Nature*, no. 2635, Oct. 4, 1924, pp. 214–221, 12 figs., *d*)

POWER-PLANT ENGINEERING (See also Railroad Engineering)

Aluminum-Coated Grate Bars

The common grate bar as used in the furnaces of marine boilers does not at first sight appear to be amenable to any considerable degree of improvement, but experiments carried out on a number of German vessels appear to indicate that by the simple expedient of coating it with aluminum a definite improvement is obtained. In one plant on land where the aluminum-coated bars were tried, no change was noticeable after the bars had been in service for six months, whereas ordinary bars installed in the same furnaces had suffered losses of about one-fifth, due to burning, and had to be renewed. The main advantage of the coated bars, however, consists not so much in their longer life as in the fact that the working of the fires is so much easier. With ordinary grate bars it is found that at a temperature of between 800 deg. and 900 deg. fahr. clinker is formed, which sticks to the bars, thus impeding the flow

of air, lowering the efficiency of the combustion, and causing the temperature of the bars to rise still further. With the aluminum-coated grate bars a coating of aluminum oxide is formed which does not melt below a temperature of 2300 deg. fahr., and the clinkers thus do not stick to the bars as the temperature is always below this figure. The air passages thus remain clear, and the cleaning of the fires is much easier. A special process is employed for coating the bars with aluminum and they are more expensive than ordinary grate bars, but the greater cost is, it is stated, more than compensated for by the longer life and the lower fuel consumption obtained. (*Shipbuilding and Shipping Age*, vol. 24, no. 15, Oct. 9, 1924, p. 419, *d*)

The Stal Boiler Unit

DESCRIPTION of a unit comprising a combined boiler, superheater, economizer, and air heater, built by the Stal Turbine Co., of Finspong, Sweden, and designed primarily to be used in connection with the Stal-Ljungström turbine as the latter is especially adapted for the utilization of steam at high pressures and temperatures.

When the working pressure of the steam is increased the boiler must be designed with the utmost care as to the elastic limits of its elements. The proper circulation of the water is another factor which must be carefully considered.

In the design of the Stal sectional-type boiler due attention has been paid to the following points:

The two separate headers are arranged in staggered position, and in this way kept closer; the distance between the sections can be considerably diminished so that the number of sections and also the number of connections for the water circulation will be increased for a certain width of the boiler.

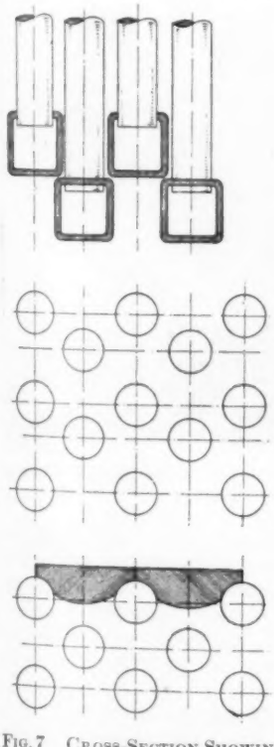


FIG. 7 CROSS-SECTION SHOWING TUBE AND HEADER SPACING IN NEW STAL SECTIONAL BOILER

Owing to this arrangement the area of the connections between the boiler drum and the sections will be 40 to 50 per cent greater than in a corresponding sectional boiler of the usual type, provided that the tube diameter and floor space are the same in both cases.

The double-row headers also allow a staggered spacing of the boiler tubes, so arranged as to provide as far as possible a constant gas velocity, determined so as to obtain the highest possible heat transmission with comparatively low draft loss.

As the distance between the tube rows is decreased, the tubes could easily be so arranged that the gases would come into contact with practically the whole tube circumference, as is clearly seen from the cross-section in Fig. 7.

The area of the circulating tubes being increased and the resistance thus decreased, it follows that the circulation will be more free and rapid; consequently the evaporation and efficiency of the boiler will be increased. The risk of local overheating also will be minimized.

Both the air and water heaters are arranged above the boiler. In most cases, however, it would prove less expensive to utilize either an air heater or an economizer of correspondingly larger dimensions to absorb all the available heat in the flue gases. The air heater is very suitable in case the feedwater has a very high temperature, making it impracticable to absorb much heat from the gases. The water-heater or economizer tubes at the feed end and the headers are placed in a horizontal position, one above the other. The combustion air is taken from the top of the boiler room, thus utilizing its heat.

The Stal boiler is built in all the usual sizes and for pressures up to 800 lb. per sq. in. A boiler designed for 600 lb. per sq. in. and 750 deg. fahr. has been in use in the company's works since 1919. The article presents results of three tests. (Boilers, Superheaters and Economizers. *Serial Report of the Prime Movers Committee* 1923–1924, Technical National Section, National Electric Light Association publication no. 24–74, September, 1924, pp. 14–15, 2 figs., *d*)

The Legal Side of Smoke Abatement

A COLLECTION of data on the police power as embodied in laws, ordinances, and court decisions for the regulation of the smoke nuisance in American cities and states.

It would appear that smoke was not considered a nuisance at common law until the decision of Chancellor Coke about 1616 in the Aldred case, when it was declared to be a nuisance against which a court might issue an injunction and the aggrieved person might recover damages.

The growth of the police power kept pace with social growth. In very recent times legislatures have extended it in many directions specifically by delegating power to pass ordinances to control smoke and to outline methods for its abatement.

The English law deals with smoke abatement as a health measure and places the enforcement of the law in the hands of the health departments of the various municipalities or parishes.

In the United States the department which shall enforce it is designated in the ordinance itself. It has been placed under the supervision of many departments. In New York, Chicago, Baltimore, and some other cities it is under the supervision of the health department. In Philadelphia it is under the boiler-inspection department. In Denver the building inspector performs the duties required by the ordinance. In Cincinnati it is an independent department. In Columbus, Ohio, it is a division of the department of public safety. In Toronto, Canada, the department of public property has charge of smoke regulation.

During the World War there was a general let-up in the enforcement of smoke-abatement ordinances. The available coal was of a poor grade and the constant order and demand from Federal sources was for increased production. Even after the war the effort toward readjustment, and the unsettled conditions of mining labor and of the coal market up to within a year or so, made the rigorous enforcement of smoke ordinances generally impracticable and inadvisable.

A typical history of smoke abatement in American cities is illustrated by the case of St. Louis, Mo. The first time the question of smoke nuisance was raised in that city was by a private suit at law, the famous case of Whelan vs. Keith, brought before a justice of the peace in St. Louis, and ultimately carried to the State Supreme Court. The defendant claimed that if the shed upon which the smoke is alleged to have escaped was entirely upon the premises of the defendant and no smoke pipe encroached or was carried off, on, or into the premises of the plaintiff, the plaintiff is not entitled to recover. The State Supreme Court found, however, that the evidence showed that the plaintiff was injured by the defendant's negligent or willful misuse of his property, although neither the shed nor the smoke pipes projected over or into the plaintiff's property. Possibly as a result of this case the first smoke-abatement ordinance in the State of Missouri, and one of the earliest in the United States, was passed. This did not directly prohibit the emission of smoke but ordered a minimum height of smokestack above adjoining buildings, which, in effect, was equivalent to a smoke-abatement measure. More than 25 years later ordinances were passed to prohibit explicitly the emission of dense black and thick gray smoke and declaring the latter a nuisance. These ordinances were sustained by the courts.

Ordinances alone do not make cities free of the smoke nuisance. Thus, for example, in Baltimore, Md., notwithstanding that a smoke-abatement ordinance was passed 18 years ago, no convictions have been secured. The ordinance placed the power to abate the smoke nuisance with the commissioner of health. Under the ordinance he can bring suits against defenders, and during the early days when it was first passed the commissioner did so, but ineffectively. In later years no efforts have been made to enforce the ordinance. This may be due to indifference or to lack of general interest or to a bad ordinance, and, as a matter of fact, the smoke-

abatement ordinance of Baltimore appears to be one of the weakest in the United States both in its general construction and in the fact that no restriction is placed on the smoke emitted from the furnace of any manufacturer. Moreover, courts have decided that municipalities may not be made defendants in suits because of neglect to enforce certain ordinances, which means that municipalities cannot be compelled to enforce ordinances.

An effort to put teeth into the smoke-abatement ordinance was made in 1913 with the aid of the Women's Civic League. This met the opposition of the mayor of that day, based on the expressed opinion that manufacturers would not locate in a city where an anti-smoke ordinance was in force.

A general survey of the situation would indicate that, in the large cities especially, the efforts toward smoke abatement are either lukewarm or fail in producing results. This is the case, for example. in such large cities as Buffalo, Chicago, Detroit, and Pittsburgh. There are a few cities where a more earnest effort to control the situation is made, for example, Cincinnati, Ohio, and Milwaukee, Wis. New York, partly because its fuel has been largely anthracite, also belongs to the class of cities where the smoke situation is in general satisfactory.

On the other hand, there are a few places, chiefly small ones, where the smoke nuisance has been solved. Among these is the village of Wilmette, Ill., where smoke offenders are promptly prosecuted and the village is approximately free from smoke. Anthracite coal is generally used, even though during the last two winters it cost $17.85 a ton. The following ordinances may be cited as an example for others:

Section 886. Dense Smoke a Nuisance. Section 7: The emission of dense smoke from the smokestack of any locomotive, or from any chimney or smokestack anywhere within said village, shall be deemed, and is hereby declared to be, a public nuisance.

Section 887. Smoke Nuisance. Penalty. Section 8: The owner or owners of any locomotive engine, and any person or persons employed as engineer or otherwise, in operating such locomotive, and the proprietor, lessee, or occupant of any building, or the person in charge of the furnace therein, who shall cause, permit, or allow dense smoke to issue or be emitted from the smokestack of any such locomotive or stationary furnace or the chimney or smokestack of any buildings within the corporate limits, shall be deemed and held guilty of creating a nuisance.

Some data on smoke abatement in foreign cities are cited and a bibliography of the subject is appended. (Lucius H. Cannon, Librarian, Municipal Reference Library, St. Louis Public Library, St. Louis, Mo., in *Smoke Abatement*, publication of St. Louis Public Library, Aug.–Sept., 1924, 319 pp., illustrated, *g*)

RAILROAD ENGINEERING

Electric Locomotive for the Detroit and Ironton

DESCRIPTION of a new type of electric motive power adopted for use on the Ford Railroad, The Detroit, Toledo and Ironton. In this case trolley power is supplied at 22,000 volts (twice as high as any previously used in this country) by 25-cycle alternating current. This is delivered to a transformer feeding into a single-phase motor, which in its turn drives a direct-current generator supplying power to eight axle-hung direct-current series-type traction motors. The alternating current is conducted through an oil circuit breaker to the primary side of the transformer. The direct current, which can be regulated from zero to 600 volts, is delivered by the motor-generator set to the traction motors connected permanently in parallel.

The use of such a combination permits employing an economic form of transmission from the central generating station and yet be entirely free from such troubles as surges encounted in alternating-current operation. The system used also permits employing a rugged electrical construction of the motors. There are further possibilities for the simplification of the mechanical parts due to the high space and weight efficiency obtained in the traction motors. (Fred Allison, H. L. Maher and L. J. Hibbard (Assoc. Mem. A.S.M.E.), in *Railway Age*, vol. 77, no. 16, Oct. 18, 1924, pp. 685–686, 1 fig., *d*)

The First Krupp Turbine Locomotive

THE Krupp Co., of Essen, has completed the first turbine locomotive in Germany employing a steam condenser. Externally the turbine locomotive does not materially differ from the reciprocating engine locomotive except in its cleaner lines and greater lack of cumbersome details, as would appear from an illustration in the original article. In the forward part of the locomotive frame is located the turbine and transmission-drive aggregate, the size of which appears from Fig. 8. The turbine unit consists of a forward and reverse turbine located in separate housings at the two ends of the gear drive, the forward turbine being at the right, looking in the direction of drive, and the reverse turbine at the left. The turbines are of the Zoelly type and have been supplied by Escher-Wyss & Co., and run at 6800 r.p.m., developing 2000 hp. at a train speed of 80 km. (50 miles) per hr. Both turbines are coupled to the layshaft of the drive.

The lubrication of the turbine bearings and gear driveshafts and teeth is supplied by a gear-driven oil pump located on the left side of the locomotive and driven directly from the gear driveshaft. The oil from the turbine passes through an oil cooler which is supplied by water from the circulation pump of the condenser.

The steam from the turbines exhausts to a surface condenser located immediately back of the turbines and connected thereto. In addition to this the exhaust chambers of the forward and reverse turbines are interconnected by a large pipe so that a part of the exhaust steam of the turbine that is in operation (i.e., the forward or reverse as the case may be) passes through the casing of the idle turbine and then reaches the condenser. This arrangement is used in order to get the steam to distribute itself as evenly as possible

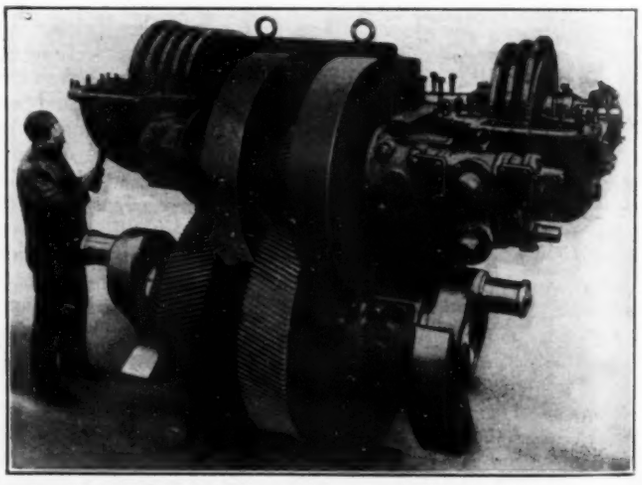


FIG. 8 MAIN TURBINE AND GEAR-DRIVE SET OF THE KRUPP TURBINE LOCOMOTIVE

through the various sets of the condenser tubes. The condenser itself is divided into two cylindrical chambers located one back of the other and connected by flexible pipes. This division was decided on for erectional reasons, as it is easier to install on a locomotive two cylindrical condensers and the weights are smaller than would be the case with a condenser of the usual rectangular cross-section. The steam which is not condensed in the first condenser goes together with the air into the second condenser where it is condensed, the air is removed from the upper part of this condenser. The condensers carry at their outer ends water chambers interconnected by the condenser tubes. The cooling water flows first through the first condenser so that the steam as it enters the condenser comes at once in contact with the coldest tubes. From there the water flows to the second condenser and then to the cooler. Both condensers are arranged in such a manner that their tubes are fully accessible as soon as the covers on both sides are removed. The tubes are not rolled in.

Back of the condensers are located the auxiliary apparatus consisting of cooling-water circulation pump, feedwater pump, and air compressor for the brakes. These auxiliary devices are driven by an auxiliary turbine supply with live steam and delivering the exhaust into the main condenser.

The boiler is of standard locomotive construction except as regards the smokebox, which is divided into two parts which are separated by a double door.

The original article shows an interesting picture of the cab of the turbine locomotive with its gages, which unfortunately cannot be reproduced for technical reasons.

The condenser-water cooler is located in the rear part of the tender and consists of individual cooler cells set in four rows one above the other and in several rows side by side. In the middle of the cooler unit is located a fan (shown in the original article) which divides the cooling unit into two parts. This fan draws in the air from both sides through the cooler units and forces it out into the open. The individual cooling cells contain Raschig rings. These are thin sheet-iron rings of about the same height as their diameter. Being simply dumped in, they are all irregularly distributed. The water coming from the condenser flows over them in a state of fine subdivision. Air is drawn in through the mass from below through a number of openings in the side wall, and because of the irregular distribution of the rings a powerful turbulence of the air takes place, resulting in intimate contact between the air and water. The cooled water is collected in special chambers and delivered to a container at the bottom of the tender by vertical pipes. From this container the water is picked up by a circulation pump. The installation is capable of absorbing 6,000,000 cal. per hr. at an air temperature of 30 deg. cent. (86 deg. fahr.).

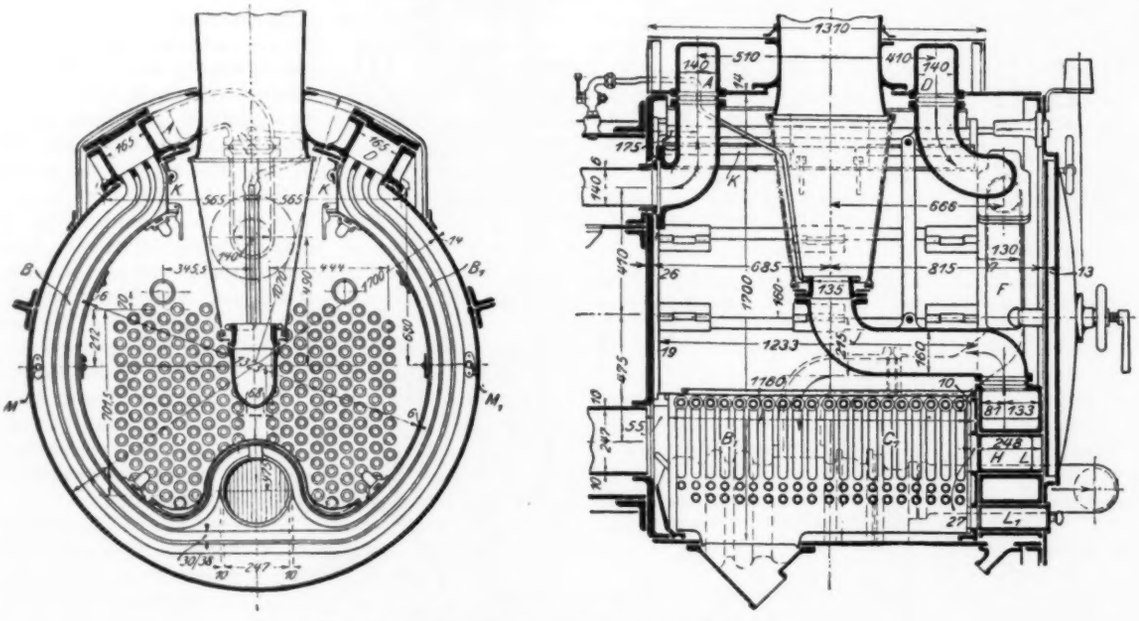
While no data of tests are presented, it is claimed that the coal consumption of the turbine locomotive is from 20 to 30 per cent lower than that of a reciprocating-engine locomotive. From another statement in the original article it would appear that the first cost of the turbine is considerably higher than that of the reciprocating-engine locomotive. (*Kruppsche Monatshefte*, vol. 5, Aug.–Sept., 1924, pp. 129–136, 8 figs., *dA*)

Locomotive Superheaters

LOCOMOTIVE superheaters must satisfy the following three essential requirements: (*a*) They must heat the steam in an economical manner to the desired temperature, 350–380 deg. cent. (662 to 716 deg. fahr.); (*b*) With a moderate first cost they must show a moderate cost of maintenance, while the life of the equipment must be as long as possible; (*c*) The construction of the superheater must be such that it will be neither inaccessible itself nor affect the operation of parts of the locomotive or make them inaccessible, a requirement that is not easy to fulfil in view of the crowded character of the space on a locomotive. What the author does next is to proceed to examine the various types, twelve in all, of superheaters used or tried on German railroads.

The Schmidt furnace-flue superheater is the first to be discussed because it was the first to be more or less successfully tried. This superheater did not give entire satisfaction because the steam passages were excessively restricted, which resulted in excessive velocity of the steam combined with a very strong drop in pressure. The velocity of the gases in the large pipes must have been also very high, with an accompanying high temperature of the exhaust gases. Furthermore, the requirements (*b*) and (*c*) were not satisfied because it did not prove possible to keep the furnace flue tight while in operation.

The furnace-flue superheater was therefore replaced by the Schmidt smokebox superheater (Figs. 9 and 10). Here the cross-sections of the steam passages were made large enough to hold the drop in pressure within reasonable limits while maintaining a sufficiently high steam velocity. The economic results on locomotives equipped with these superheaters were entirely satisfactory, and on running overload (as was inevitable with the comparatively small locomotives used) steam temperatures in excess of 380 deg. cent. (716 deg. fahr.) were obtained. The steam passages were so arranged that over about half of its path the steam flowed in counter-current to the gases, this being done in order to improve the heat transfer. Unfortunately, however, the life of this construction proved also to be short, because of the difficulty of maintaining the 250-mm. (10-in.) flue tight.



FIGS. 9 AND 10 THE SCHMIDT SMOKEBOX SUPERHEATER
(All measurements in mm.)

As soon as the troubles with the furnace flue were properly understood, an effort was made to eliminate them by decreasing the pipe diameter through a return to the longitudinal location of the superheater units. Essentially the endeavor has succeeded and resulted in the standard construction of the large-pipe superheater of the German State Railways (Figs. 11 and 12) which has been adopted nearly everywhere abroad with scarcely any changes. Here the steam flows with three reversals through 180 deg. in four tubes located in a single fire tube.

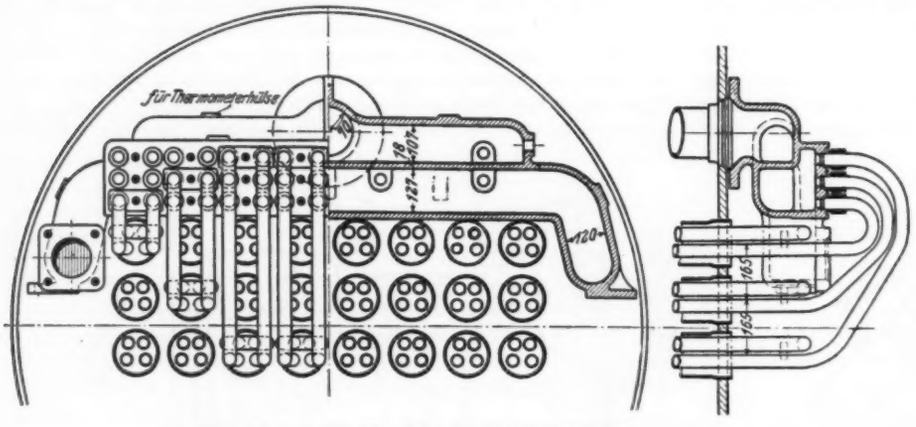
With this arrangement it has proved to be a comparatively simple task to obtain suitable steam and gas velocities for ordinary boiler lengths by properly dimensioning the diameters of the steam and fire tubes.

The success of this type had a good deal to do with the establishment of the general popularity of the fire-tube superheater. It also led to the discussion of the question as to the zone in which the process of superheat should be located, a question which the author discusses in some detail. The experimental work carried out with this in view is also briefly described.

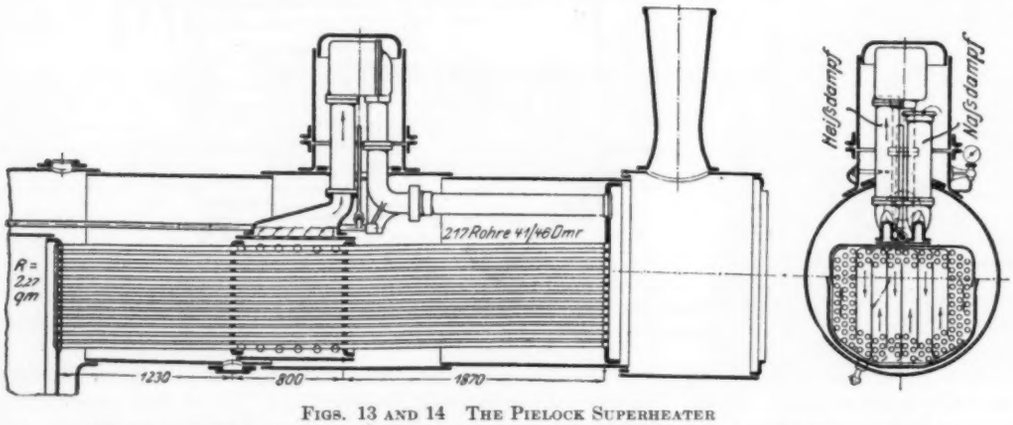
Superheaters of an entirely different character from those described above are represented by the box type, of which the Pielock and Esslinger are mentioned especially. Of these the Pielock (Figs. 13 and 14) has a box inserted into a cylindrical boiler through which pass all the fire tubes, and the arrangement is such that the steam guided by baffles travels the longest possible way, crosswise

to the tubes, and circulates around them. With this superheater only steam temperatures of 230 to 260 deg. cent. (446 to 500 deg. fahr.) can be obtained. The trouble is due to the fact that the velocity of the steam freely flowing around the tubes was much too small to insure proper heat absorption. The transfer took place in cross-flow, while the hot gases were led straight along. Furthermore, the Pielock superheater could not be located in the region of the greatest temperature difference, because if this were done the superheater tubes not cooled by water would be rapidly raised to a white heat and destroyed.

The Esslinger box superheater is based on the same idea but



FIGS. 11 AND 12 THE SCHMIDT SMOKE-TUBE SUPERHEATER
(All measurements in mm.; *für thermometerhülse* = for thermometer plug.)



FIGS. 13 AND 14 THE PIELOCK SUPERHEATER
(All measurements in mm.; *Rohre* = tubes; *heisdampf* = superheated steam; *nassdampf* = wet steam.)

extent than the stream of gas in the inner pipe which is cooled by the steam only and moves in parallel flow with the steam. The result of this is that too little heat is removed from the inner stream of gas and it escapes at too high a temperature. A test on a small scale with a single unit has shown that the thermal efficiency of this type is no better than that of the standard type.

Two other superheaters described in the original article, namely, the Dauner and the superheater built by the German Evaporator Co., seek to solve the problem by concentrating the superheater surface in the hot zone, while only the inlet and outlet pipes are located in the forward part of the fire tube.

Neither of these designs has shown any clear advantages during tests. A design somewhat similar to Dauner's is embodied in a Swedish superheater built by the Uddeholm Tube Co.

Extensive tests were made with superheaters on German locomotives. As originally installed, the superheater on one of the locomotives gave a temperature of only 300 to 320 deg. cent. (572 to 608 deg. fahr.). The superheater surface was then increased by installing additional units and some other changes, were made which resulted in the temperature of superheat being raised to 340 deg. cent. (644 deg. fahr.). The most important factor which contributed to the better performance was the shifting of a part of the superheater elements into the hot zone. It was also claimed that the installation of additional tubes resulted not only in the increase of heat transfer, but also in the increase of the cross-section of the steam passages, which permitted an increase of velocity of the flow of steam.

The author points out the necessity of properly proportioning of the fire tubes so that they will permit maintaining a suitable velocity of the gases. He further points out that the best results were obtained when the ratio F/Q was 400 to 420 (F in square meters is the sum of the areas of walls where gas friction occurs, and Q in square meters is the free cross-section of the tubes). (R. T. Wagner in *Zeitschrift des Vereines deutscher Ingenieure*, vol. 68, no. 37, Sept. 13, 1924, pp. 951–956, *dcA*)

applied in another way, and is noticeable for its good structural design. In this superheater the cylindrical boiler is "interrupted" by the superheater chamber, thus making it consist of two nests of fire tubes located in series with a smokebox in between the two. The superheater tubes are set in a winding manner crosswise through the box so as to be impinged upon by the gases flowing crosswise. With this construction also no very high temperatures have been obtained, 280 deg. cent. (536 deg. fahr.) being about the limit. Even though the steam was properly led, the gases in the box had a comparatively low velocity and therefore gave up only a small amount of their heat. Here also it proved to be difficult to locate the superheater in a zone of high temperatures as then the rear nest of fire tubes became too short (only 400 mm. or, say, 16 in.) and stiff, and this affected the life of the tube walls; the cooling of the box walls also became difficult.

The author proceeds to a description of several types of superheaters in which an attempt was made to use tubes of comparatively small diameter. None of these seems to have given satisfaction, so that the German State Railways appear to have come to the conclusion that their efforts should be limited to developing the standard type with large tubes. In this connection the author mentions other designs, such as the Platz-Jakobsen, in which the steam is led back and forth through a fire tube in two concentric tubes. The structure is such that the stream of gas between the fire-tube wall and the inner tube leaving the steam bath is cooled to a greater

Recent Developments in Locomotive Design in Germany

IN GERMANY as elsewhere strenuous efforts are now being made to increase the efficiency and economy of locomotive operation by the use of superheat, feedwater heating, and the employment of higher temperatures and pressures, as well as the use of condensation. At first considerable difficulties were encountered in the employment of condensation because of the lack on locomotives of cooling water and the restricted possibilities of granting it the necessary space and weight, and because of the use of steam for increasing the stack draft. Most of these have been largely overcome and numerous classes of condensers have come up for consideration for use in locomotives. The author classifies them in accordance with the degree to which the steam, water, and air are intermixed or kept apart. Jet condensers with evaporation coolers are suitable for reciprocating-engine locomotives as the feedwater is already somewhat contaminated notwithstanding the use of oil separators, and further contamination through addition of impurities from cooling air is not so objectionable. The unit is also very light and may be placed close to the steam cylinders. It has not been used on locomotives, however, because of the fear of what might happen as a result of bringing oil into the boiler, even though small amounts of

oil cannot do much harm in the boiler and, as a matter of fact, on some railroads oil is deliberately introduced into the boiler to make scale more brittle.

Jet condensers with surface cooling are rather difficult to use because of the large surfaces required, but they avoid the loss of water encountered in evaporator coolers. This advantage is not of sufficient importance to justify the use of this type on locomotives.

The surface condenser with evaporation cooling is the type used in the Krupp turbine locomotive. The condenser is set as close to the turbine as it can be in order to make the very large exhaust piping as short as possible. The feedwater is here free from oil and the contamination of the cooling water is harmless.

The surface condenser with surface cooling is a type in which the intermediary member of the cooling-water equipment can be eliminated when, as in the Ljungström turbine locomotive, the cooler and condenser are combined in a single unit. In order to avoid excessive length of piping the turbine has to be located in immediate proximity to the cooler, and both must be on the same running gear—which is contrary to the usual practice in which the boiler and prime mover are on the locomotive and the cooler on the tender.

From this it would appear that generally the surface condenser with evaporation cooling is the most suitable type, although the Ljungström surface cooler has given very remarkable results.

Essentially condensation is applicable to both reciprocating and turbine locomotives. A three-cylinder uniflow locomotive has been built with a cylinder bore of 750 mm. (30 in.) and given an output of over 2000 hp. with a piston speed of 5 meters (16.4 ft.) per sec. The uniflow engine is here fully applicable because of the great pressure head, and the condensers are smaller because the exhaust steam pressure and the temperature head are large as compared with the cooling air.

The maximum torque of the steam turbine at starting is about twice as great as at the optimum velocity, and from this it would appear that the use of reduction gearing or electrical transmission is unnecessary. On the other hand, the steam consumption during the period immediately after starting is very high, but falls off on reaching the critical velocity to that of a reciprocating locomotive, and when the velocity increases still further, goes below it.

The reliability and efficiency of reduction gearing is such as to satisfy all practical requirements. The problem of reverse drive has not been satisfactorily solved. Ljungström uses for this purpose an intermediary member in the reduction gearing, a method which may be questioned. Krupp and Zoelly use reverse turbines which are only big enough for maneuvering. From the practice employed in Diesel locomotives it seems possible that ultimately the turbine shaft will be located along the longitudinal axis of the locomotive and the drive shaft will be driven through two sets of bevel gears, some kind of a coupling, for example, magnetic, being employed to connect either one or the other set of gears, depending on the direction of motion.

The resort to higher pressures requires also the use of higher steam temperatures, but in the case of the turbine there is no difficulty in their employment as far as the prime-mover elements are concerned. The situation is somewhat less satisfactory in regard to the boiler and superheater. The employment of higher pressures and temperatures requires that a superheater be located in the flue or what corresponds to it. The high-pressure superheater has to be supplied with really hot gases in order to make it possible to attain with certainty a steam temperature of 400 deg. cent. (752 deg. fahr.). This and the fact that it is impossible to build a Stephenson-type boiler to operate safely at a pressure of more than 20 atmos. (280 lb.), make it necessary to resort to the development of new types of boilers; and it would appear that only water-tube boilers can be here considered, as they permit locating the live-steam superheater at any place where the desired temperature conditions are present and also permit building the furnace in such a manner as to make the employment of pulverized fuel possible. This latter is important because of the great desirability of using low-grade fuels and semi-coke on locomotives. Water-tube boilers can be used in the restricted space available in locomotives only provided essentially pure feedwater is used. This requirement may be fully satisfied by the employment of surface condensers.

Side by side with improvement in steam utilization goes increase in boiler efficiency. Steam condensation makes it necessary to add to the usual locomotive auxiliaries machinery for driving the suction blower, the cooling-air fan, and the air and cooling-water pumps. The exhaust steam from these auxiliary apparatus becomes available at various pressures and is used by Ljungström in accordance with the range of pressures for gradually preheating the feedwater up to a temperature of 140 deg. cent. (284 deg. fahr.).

Ljungström also uses the exhaust gases for preheating the air of combustion, not so much in order to increase the combustion temperature as to protect the exhaust-gas blowers by lowering the temperature of the exhaust gases.

The development of the steam locomotive lies apparently in the direction of quite a complicated plant, which may, however, be made quite reliable notwithstanding this complication provided the questions of attendance and maintenance are properly handled. As a matter of fact, simplicity and ease of maintenance by no means always go hand in hand. From the heat-economics point of view modern developments should result in a material improvement of thermal efficiency, say, from the present value of 15 per cent to about 20 per cent.

The author proceeds next to the discussion of internal-combustion locomotives and describes briefly several types, none of which, however, seem to have given satisfaction. He points out, though, how in some designs an approach to satisfactory performance is reached by the employment of gear drives with magnetic couplings and balancing weights. At the same time he calls attention to the fact that in Germany, at least, the prospects of the Diesel locomotive do not appear to be very bright because of the comparative lack and high cost of liquid fuel.

He mentions finally the hydrogen locomotive, for which gas is produced by the electrolytic decomposition of water. The idea is to produce hydrogen in this way, using current from central stations during their slack periods, and to carry it in containers on the locomotive. The hydrogen is used simply as fuel to make steam. The author presents calculations which show that under these conditions a sufficient price could be charged for the hydrogen gas to make its production worth while as an off-peak load for central stations under certain conditions. (Prof. F. Meineke in *Zeitschrift des Vereines deutscher Ingenieure*, vol. 68, no. 37, Sept. 13, 1924, pp. 937–942, 13 figs., *dc*)

REFRIGERATING ENGINEERING

Small Domestic Refrigerating Machines

THE author considers the difficult problem of designing and building a small domestic refrigerating machine as having been solved, and describes some types on the European market. The first of these is the "Frigorigène." In this the compressor is enclosed in an airtight jacket consisting of two copper spheres, the first of which forms the condenser and also contains the compressor, while the second constitutes the evaporator. The compressor is freely mounted on a hollow shaft passing through the spheres and is held in a vertical position by its own weight. The shaft and spheres are rotated by a motor while the compressor remains vertical and stationary, a handle actuating the pistons of the compressor, which is of the two-cylinder type.

Sulphurous acid is used as the working liquid. It is evaporated in the second sphere forming the evaporator and delivered by suction through the hollow shaft into the cylinders of the compressor. It is there strongly compressed and then permitted to escape into the jacket of the first sphere, which constitutes the condenser. There it is liquefied by contact with the metal wall which is cooled by being washed by cold water. The liquefied gas then goes to the evaporator and is there evaporated, taking up heat from the brine.

The compressor consists of two short cylinders, and as it works in the same atmosphere as that which it handles, minor leaks are immaterial. The quantity of gas admitted to the cylinder is regulated not by valves but by the oscillating movement of the cylinders. An ingenious arrangement is used for lubrication. The working fluid in liquid form as well as the lubricating oil are introduced in a predetermined quantity at the time the apparatus is erected at the shop. Both are carried away by the gyratory motion of the sphere and separated according to their densities

by centrifugal force. The oil is then carried to the compressor by a proper device. Sulphurous acid was selected as the working fluid because of the fact that it develops only innocuous pressures in the event that by negligence or accidentally the supply of cooling water should happen to be cut off.

In the "Autofrigor" refrigerator a vertical shaft is used. The working fluid is methyl chloride, and in this apparatus as in the preceding one, all the working fluid and lubricant necessary for several years of operation is put in at the time of the erection of the device.

Comparatively little is known of the third apparatus, the "Frigorotor," except that the compressor is of the rotary valveless type and the condenser is of the countercurrent type.

The "Polaire" refrigerator works on a principle different from all the others, because refrigeration is produced by a gas liberated from a solution by heat and reabsorbed by the solution on its losing temperature. The advantage claimed for this system is that it does not employ any compressor, motors, or moving apparatus. The operation of the device is as follows:

First Stage (lasting approximately 1½ hr.). A supersaturated solution of ammonia contained in a heating cylinder is brought to boiling by electric or gas heating. The ammonia gas which is formed passes into the separator where it is freed from entrained water vapor. The anhydrous gas then goes to a condenser formed by coils cooled by water circulation. The gas is there liquefied and eventually collects in the lower part of the evaporator.

Second Stage (lasting approximately twice as long as the first one). The testing of the liquid being completed (which takes place when the temperature in the heater has reached approximately 115 deg. cent. = 419 deg. fahr.), the heat is automatically cut off and the cooling of such solution as remains in the heater is accelerated by a circulation of cold water. Under these conditions the liquid ammonia passes back to the gaseous state and returns to the heater where it is absorbed by the water. The change of state which it undergoes in the rest of tubes of the evaporator causes a pronounced drop in temperature, which is used for refrigeration. As soon as this takes place the first part of the cycle recommences automatically. (Chas. Schlumberger in *Bulletin de la Société Industrielle de Mulhouse*, vol. 90, no. 6, June–Aug., 1924, pp. 405–412, 3 figs., *d*)

SHIPBUILDING

A 20,000-Ton Diesel Electric Liner

DESCRIPTION of a suggested propelling-machinery arrangement for a 20,000-ton liner as suitable for the transatlantic trade.

The fuel bill is a large item of running expenses of ships which makes it of importance in considering ship design. Of the factors materially affecting the cost of fuel the following two are particularly mentioned: The price per unit of heat energy available, and the overall efficiency from the heat energy in the fuel to the work done at the propellers. As regards the former, it is pointed out that coal having 14,000 B.t.u. per lb. at 25 s. a ton gives the same price per unit of energy available as oil with 18,500 B.t.u. per lb. at a cost up to 33 s. per ton.

For a 20,000-ton liner may be used either a steam-turbine plant with mechanical speed-reduction gears to the propellers or Diesel engines. There is now being built for the Union Castle Line at Belfast a 20,000-ton liner to be engined with direct-drive Diesels. The author of the paper favors the use of a number of small high-speed Diesels in combination with electric drive, that is, on the multiple-unit system, for the following reasons: Greater reliability, as part of a multiple-unit plant may be shut down without stopping the ship; the size of the parts in the smaller engines makes repairs easier; the engines are simpler by not having to be reversible, maneuvering being operated by the electrical apparatus; power per cylinder does not have to be too large; small high-speed engines can be totally enclosed and therefore designed for a very efficient lubrication system.

The author believes that at the present stage of development it does not seem practicable to engine a liner of 12,500 shaft hp. with Diesels except by the use of electric drive.

The author compares in particular the relative merits of the two systems that would appear most competitive, that is, steam turbines with mechanical gears and the Diesel-electric, the proposed Diesel-electric equipment to have eight Diesel engines, four alternating-current generators, and four induction motors. The propellers are to be designed for 16 knots at 120 r.p.m. as compared with 80 r.p.m. for turbine ships. The higher mean speed of propellers involves a probable loss in propulsive efficiency of about 2 per cent. The computation of Diesel-engine efficiencies is based on the results obtained with the motorship *Havelland*, a cargo boat built by Blohm and Voss of Hamburg for the Hamburg-American Line. One of the unusual features of the design described here is that instead of the usual direct current, alternating current is recommended because of its lower initial cost, greater robustness, and necessity for less attention in service. The main generators would have to be specially designed, however, for the duty required and the author gives the specifications. Two induction motors are to be used on each shaft.

The estimated performances of boilers and gear turbines on the one hand, and the Diesel-electric plant on the other, are given. It is considered that in a round trip of 28 days, of which 18 days are spent at sea and 10 days in port, there would be a saving of 27 per cent on the fuel cost, but the cost of the propelling machinery would be, for practically the same weight of the plant, £100,000 for steam and £150,000 for the Diesel-electric plant, the insurance and depreciation charges being also higher with the Diesel. Because of the saving in fuel oil, the total profits would be higher for the motorship than for the Diesel. (Percival J. Higgs in *Transactions of the Institute of Marine Engineers*, vol. 36, Aug., 1924, original paper pp. 197–222, 11 figs. and discussion pp. 222–234, *d*)

SPECIAL PROCESSES

New Lock-Joint Brass Tubes

DESCRIPTION of a method for making these tubes developed by William Jaquiery. The machine used in this method forms the tube from a sheet of brass, locks it, and draws it down to smaller sizes in one operation.

A strip of brass is fed into the machine from an ordinary reel of sheet brass. Small wheels bend the strip into a "U," in the same direction, close against the sides of the "U." That is, the edge of the right-hand side of the "U" is bent back almost parallel with the edge. The edge of the left side of the "U" is bent also to the right, being bent back inside the "U" nearly parallel with the sides. As the strip proceeds through the machine the right-hand bent edge is caught under the left-hand bent edge and the two are locked together by the pressure exerted as the new-formed tube is passed through a die. The tube then passes through another die which reduces it and it comes out on an ordinary draw bench where it is caught by the automatic pulley of the bench and redrawn.

The draw benches are automatically operated, two of the tube-forming machines being operated in conjunction with one bench so that one can draw tubes at the rate of 25 ft. per min. (*The Metal Industry*, vol. 22, no. 9, Sept., 1924, p. 372, 1 fig., *d*)

TESTING AND MEASUREMENTS

Work of Fatigue Panel of Aeronautical Research Committee

SHORTLY after the war the Aeronautical Research Committee appointed a Board to investigate the problem of the fatigue of metals. The main problems with which the Board is dealing may be stated in a series of questions: Why does it require a large number of alternations of strain to cause a fatigue fracture? Does this failure originate within a crystal or between the crystals: if within a crystal, does it begin in the middle or at a boundary? Does the failure occur in tension, or by shearing? How is the plane of the initial failure related to the axes of the principal stresses and to the crystal lattice (if it occurs within a crystal)? How is fatigue failure connected with hysteresis in elasticity?

One of the first questions dealt with was standardization of nomenclature. Fatigue limits are quoted by the Board in terms of strain rather than stress in many cases, for reasons explained in the original article.

One of the practical difficulties in studying fatigue is that it takes such a long time to determine a fatigue limit, and a search

was made for quicker methods of finding it. A successful method was found by Mr. Gough at the National Physical Laboratory. It consists in finding the limit of proportionality for a rotating test piece (Woehler), i.e., the stress at which the deflection of the rotating test piece ceases to be proportional to the load. A mirror is fixed on the end of the Woehler test piece and accurately adjusted so that its plane is normal to the axis of rotation. A telescope and scale fixed in front of the mirror, and at a considerable distance from it, enable the deflections to be accurately observed. Gough found that the limit of proportionality determined in this way corresponded very closely with the fatigue limit determined by long runs in the ordinary way. The whole test can be completed in an hour, on a single test piece. Subsequent investigations, however, have shown that this test does not always give true results.

Another method of quickly finding the fatigue limit was then investigated. Hopkinson had pointed out that there should be a rapid rise of temperature of the test piece when the fatigue limit was passed owing to hysteresis, so Mr. Gough, Professor Haigh, and Dr. Griffith made experiments on these lines. The results were quite unexpected. It was found by Haigh, when nickel was tested in this way, that there were a series of "heat bursts," or sudden evolutions of heat which rapidly died away again, as the load was steadily increased. The same phenomenon was afterward observed with other metals, e.g., in hard steels, though not so strongly marked. Griffith found that in Armco iron heat was generated at quite low stresses, and that there was no marked increase when the fatigue limit was passed. Gough also found that the heat generated gave no clear indication of the fatigue limit. These results confirmed earlier tests by Rowlett, who had shown that there was elastic hysteresis at quite low stresses. Griffith's method of testing is particularly good, as it enables him to photograph the load-strain hysteresis loops while running the test and simultaneously to measure the heat generated.

A third investigation, on somewhat similar lines, has been made by Professor Mason, though with a rather different object. Mason measured the amount of work being put into the Woehler test piece by an extension of Gough's method of measuring the deflection. If work is being put into the test piece, its deflection will not be exactly vertical, but slightly to one side. The sideways deflection measures the arm of the couple doing work on the specimen. Mason measured this sideways deflection. His results confirm the fact that there is no sudden change in the work being done on the test piece at the fatigue limit. No general method has so far been found for quickly ascertaining the fatigue limit, though Gough's method can be used successfully in many cases and the high-speed tests referred to later require only about an hour each.

While experimenting with Gough's mirror apparatus, Professor Lea found that the limit of proportionality could be raised (some 30 per cent in his samples) by removing the load and then reapplying a slightly larger load. He showed that this change represented a real raising of the fatigue limit. Gough has extended these experiments and has succeeded, by a slightly different procedure, in raising the fatigue limit still further. It appears that the metal is hardened in some way by fatigue, if the strain is not excessive. This fact has also been demonstrated by Doctor Aitchison, who showed that the Brinell tests were higher on metal that had been fatigued. The action, at first sight, appears to be somewhat analogous to the strengthening of metal by cold work, but it must be remembered that in the fatigue tests the dimensions of the test piece are unaltered, and there is nothing analogous to the rolling down or wire drawing used in applying cold work. A possible explanation of the hardening produced by fatigue is given in a paper by Gough and Hanson.

Numerous failures in airplane-engine parts had drawn attention during the war to the importance of concentrations of stress at fillets, screw threads, oil holes, and other parts where sudden changes of shape occurred, and theory appeared to indicate that under alternating stresses fatigues ought to occur at such points when the mean stress in the neighboring metal was far below the fatigue limit. There appeared to be no reason why such failures should not occur, even though the sharp corners were very minute; in fact, scratches of microscopic dimensions might start fatigue cracks, which, once started, must spread. An investigation of this problem was therefore made in the author's laboratory by Mr. Thomas. Scratches were made by diamond points and by very finely ground steel tools; their shapes were accurately determined by making gelatine casts of the scratches and then cutting microtome sections of the gelatine and photographing them under the microscope. As a result it was found that the weakening effect of the sharpest scratches did not exceed 30 per cent—a sufficiently serious reduction of strength, though far less than theory had suggested. By comparing the shapes of the scratches made by files and emery, an estimate was made of the effect of various styles of machine finish on the strength of the metal.

Other tests are described in the original article. For example, to determine whether fatigue strength would go up if the rate of elongation were increased. Another investigation dealt with the strength of springs. (Prof. C. F. Jenkin in a paper read before Section G of the British Association at Toronto, August 11, 1924. *Engineering*, vol. 118, no. 3059, Aug. 15, 1924, p. 245, *eA*)

VARIA

Energy Expenditure of the Yale Crew

DATA of an investigation of physiological processes of the Yale crew preparing for the 1924 Olympic championship.

A few minutes before the crew left for New London, final tests were run on three men, Wilson, Kingsbury, and Spock, now rowing Nos. 2, 6, and 7 on the Varsity crew. The efficiency reached as the result of training was strikingly shown, and the results furnish a basis for calculating the energy expended during a race. The energy is actually measured by the amount of oxygen consumed each minute; one liter of oxygen giving 4.8 cal. of heat, or 2080 kg-m., or 15,000 ft-lb., or nearly half a horsepower for a minute. About one-fourth of the energy produced goes into the oar and is applied to driving the boat; a higher efficiency than most steam or gasoline engines attain.

An ordinary man sitting quiet breathes about 6 liters of air a minute and consumes about 0.25 liter of oxygen. His maximal effort involves about eight times as much air and oxygen. The ordinary class crews reach about 3 liters of oxygen consumed per man per minute during a vigorous effort.

The Varsity men are now consuming about 0.4 liter of oxygen, even when sitting at rest. They are able to carry a consumption of oxygen well up to 3 liters of oxygen per minute for the whole period of a race, and each man breathes 60 to 70 liters (15 to 17 gal.) of air a minute. For two or three minutes at a time they can get up to an oxygen consumption of 4 liters per minute. This is as high a figure as has ever been measured on man. During the first two or three minutes of a race they also run up an oxygen deficit of 4 or 5 liters. The total energy production of each man is thus well up toward four horsepower in the first few minutes, with nearly one horsepower driving the boat through each oar. The fuel consumption of a four-mile race amounts to between a quarter- and a half-pound of sugar per man.

Men who are untrained continue to breathe abnormally for a long time after exertion. The crew men can make a maximal exertion for three or four minutes, and return practically to normal within ten minutes thereafter. They have so large an oxygen intake that they are not compelled to overdraw their account, or use their "oxygen credit" to any great extent, unless very hard pushed, and they pay it back quickly and easily afterward. A number of other interesting and valuable facts have developed from this investigation which will be published in full in a scientific journal. (Yandell Henderson, Prof. of Applied Physiology, Yale University, New Haven, Conn., in *The Yale Alumni Weekly*, vol. 34, no. 2, Sept. 26, 1924, p. 38, *e*)

CLASSIFICATION OF ARTICLES

Articles appearing in the Survey are classified as *c* comparative; *d* descriptive; *e* experimental; *g* general; *h* historical; *m* mathematical; *p* practical; *s* statistical; *t* theoretical. Articles of especial merit are rated *A* by the reviewer. Opinions expressed are those of the reviewer, not of the Society.

Test Code for Gas Producers

Tentative Draft of a Code in the Series of Nineteen being Formulated by the A.S.M.E. Committee on Power Test Codes

The Main Committee on Power Test Codes takes pleasure in presenting a tentative Test Code for Gas Producers for criticism and comment. The Individual Committee which developed this code consists of Dr. W. T. Magruder, Chairman, W. B. Chapman, R. H. Fernald, G. J. Rathbun, C. D. Smith and H. F. Smith.

In 1918 the Committee on Power Test Codes was organized by the Council of the A.S.M.E. to revise and enlarge the Power Test Codes of the Society published in 1915. The committee consists of a Main Committee of twenty-five members under the chairmanship of Fred R. Low, and nineteen Individual Committees of specialists who are drafting test codes for the various prime movers and the other auxiliary apparatus which constitutes power plant equipment.

The Individual Committee, the Main Committee and the Society will welcome suggestions for corrections or additions to this draft of its code from those who are specially interested in the manufacture and use of Gas Producers. These comments should be addressed to the Chairman of the Committee in care of The American Society of Mechanical Engineers, 29 West 39th Street, New York, N. Y.

Introduction

1 General instructions for the conduct of tests are given in the division of this code entitled "General Instructions," and that division should be studied carefully and followed in detail. In particular, before any test is begun, the object sought must be determined and agreed upon by all interested parties, and must be borne in mind throughout the test.

2 The "Code on Definitions and Values" defines certain technical terms and numerical constants which are used throughout this code with the meaning and values there established.

3 The "Code on Instruments and Apparatus" discusses fully the selection, calibration, application, and use of instruments for test observations. Those parts of that code covering instruments to be used in a gas producer test should be studied in detail and followed accurately and fully in arranging for and conducting tests. In the following paragraphs, specific references are given to paragraphs in the "Code on Instruments and Apparatus."

4 This code for conducting tests of gas producers is intended primarily for tests of producers whose gas is to be used for power purposes, but also may be used for those generating gas for metallurgical and other heating purposes. The term "fuel," as herein used, includes all possible fuels—coals, coke, charcoal, refuse, and oils. In testing a gas producer, tests of the auxiliary apparatus must be frequently included, as being essential parts of the gas-generating unit. If a complete test of the gas-producer plant is desired, separate records should be made of the amounts of fuel, water, manual and skilled labor, electric current, and of the power required to operate the producer and each of its auxiliaries, the cost of each of same, and the usual calculations should be made and the proper conclusions drawn.

Objects

5 In accordance with the "General Instructions" the objects of the test should be definitely determined and recorded before the preparations are made. If the object relates to the fulfilment of a contract-guarantee, an agreement should be made between the interested parties concerning all matters about which disputes may arise, as noted in Par. 2 of the "General Instructions," and the points agreed upon should be stated in the Report of the Test. Some of the objects for which tests of this character may be made are to determine:

(*a*) The maximum and most efficient capacities of the producer plant and of each of its several elements
(*b*) The efficiency of the producer as a whole in making gas, and the efficiencies of each of its several elements
(*c*) The ability of the producer to use a particular kind of fuel, and in a particular way
(*d*) The labor and power required to operate the producer
(*e*) The quantity of cooling water required
(*f*) The cleanness of the gas delivered
(*g*) Comparisons of different kinds and sizes of fuels and the results obtained by using them in different ways
(*h*) Comparison of the amounts of manual and skilled labor and of the electric current or power required to operate the producer and each of its auxiliaries
(*i*) The causes for the faulty operation of the producer. When tests are made to determine the effect of changing one variable all the other variables should be kept constant during these tests.

Measurements

6 The measurements involved in the test of a gas producer and of its auxiliaries will depend to some extent upon the objects for which the test is conducted as defined in Par. 2 above. In general, these measurements will include several of the following quantities:

(*a*) The general data relative to the type of producer and of each of its auxiliaries and their principal and important dimensions, as defined in Table 1, Items 7 to 35. These should be determined from the drawings and checked from the plant
(*b*) The sizes and weights of each of the solid fuels, the weight of oil, and the weight of tar supplied to the producer and their physical characteristics and rates of firing
(*c*) The ultimate and proximate analyses and the calorific values of the fuel and tar supplied to the producer and of the hot gas, cleaned gas, and tar delivered by the producer plant, and the specific gravity of each of the above
(*d*) The weights of water and their total heats above 68 deg. fahr. supplied to the producer and to each of its auxiliaries, and their rates of supply
(*e*) The volume, pressure, temperature, and humidity of the air delivered to the producer
(*f*) The temperatures of the water delivered to the producer and to each of its auxiliaries, of the steam generated, and its quality, of the gas delivered to and by each of the units of the plant wherever a change of temperature occurs
(*g*) The barometric pressure and the temperature of the atmosphere, the pressures of the steam at the steam jet, in the evaporator, in the boiler and elsewhere, the suctions and pressures of the gas before and after passing each auxiliary and on being measured for calorific value and quantity
(*h*) The humidity of the air and steam delivered to the producer
(*i*) The quantity of gas of known temperature, absolute pressure, analysis, humidity, and calorific value delivered, and the rate of generation
(*j*) The amounts of gross power used in operating scrubbers, purifiers, pumps, exhausters, and each of the other auxiliaries and in cleaning, rotating and in poking the producer
(*k*) The amounts of manual and skilled labor used in operating the producer and each of its auxiliaries
(*l*) The scaling properties of the water
(*m*) The wear and tear and length of life of the fuel-feeding devices, grates, valves, cleaning materials used, and of engines, motors, and other auxiliaries
(*n*) The size of coal should be determined by screening a sample, using screens referred to in the General Instructions.

Instruments and Apparatus

7 The apparatus and instruments required for producer tests are:

(*a*) Measuring rods, rules, or tapes
(*b*) Platform scales and weighing vessels of ample capacity for weighing fuels, ashes, and waters
(*c*) Fuel sampling and analyzing appliances and appurtenances, and hydrometers
(*d*) Fuel calorimeter and its appurtenances, including extra calibrated thermometers
(*e*) Steam calorimeters, including extra calibrated thermometers
(*f*) Gas calorimeters, both sampling and continuous, with sampling tubes, and an ample supply of suitable water at a constant pressure and at a temperature preferably as much below the temperature of the air of the room and of the burnt gases as the outlet temperature of the water is above that temperature
(*g*) Gas-analyzing apparatus and appurtenances
(*h*) Tar determinator
(*i*) Soot determinator
(*j*) Moisture determinator
(*k*) Gas meter, venturi meter, pitot meter, orifice meter, or other suitable apparatus, for measuring the gas output with accompanying thermometers, thermometer wells, and manometers or pressure gages
(*l*) Manometers, draft and pressure gages
(*m*) Water meters, or other water-measuring apparatus, for measuring

feed and scrubber waters and steam meters, or the equivalents, for measuring the steam used by each of the units of the plant. If water is weighed, the use of 2½-in., or larger, quick-opening valves for 600 to 1000-lb. tanks is recommended

(*n*) Thermometers and wells

(*o*) Instruments for measuring or determining the power required to rotate the producer, to poke the producer, to operate the water pump, oil-fuel pump, tar extractor, scrubber, purifier, and each of the other motive appliances

(*p*) A continuous indicating calorimeter showing the heating value of the gas being delivered furnishes a valuable adjunct for both testing and operating purposes

(*q*) Such apparatus, instruments, and appliances as may be needed to calibrate and insure the correctness of each of the above.

Full directions concerning the use and calibration of the above noted appliances are given in the Code on Instruments and Apparatus.

The location of the pitot tube, or orifice, if used, should be in the delivery pipe at a point either near the producer for uncleaned fuel gas, or beyond the scrubber for power and cleaned gas, and at least ten diameters beyond the last fitting, or at both points, according to the use to be made of the gas and other requirements.

PREPARATIONS

8 First, Paragraphs 1 to 30 of the "General Instructions" should be read and studied carefully. Next, the dimensions of the producer and of each of its appurtenances and appliances, and the physical condition of each should be carefully determined and recorded. The testing appliances, etc. should then be installed, as directed in the General Instructions, and the preparations completed for making the test, including the provision of an adequate number of suitably prepared log blanks and other supplies which may be needed for the different pieces of apparatus, appliances, and auxiliaries. With a suction producer, tests should be made for air leaks which should be stopped. The use of photographs taken of the assembled equipments is recommended.

OPERATING CONDITIONS

9 The method of testing, the length of the test and the operating conditions necessary to conform to the object of the test should then be determined. Care should be taken to see that these conditions are maintained throughout the test.

The character of the fuel to be used should be determined. If an untried fuel is selected, a preliminary trial of the fuel in this apparatus should be made and the best method of using it ascertained. Whatever the fuel, it should be weighed and not measured. It should be sampled for dryness and due allowance made for the moisture so used in producing gas during the test.

10 In tests of maximum efficiency and capacity of a producer for comparison with other producers, the fuel should be of the kind which is commercially regarded as a standard for such use in the locality where the test is made. Unless previously decided otherwise, the fuel selected for test of the gas producer should be the best of the class so selected, free from unusual slag-forming impurities, and of the proper and uniform size for its specific use. In making comparative tests of different producers, care should be taken to see that each producer is operated in a normal and ordinary manner and that each receives uniform and equal care and attention.

DURATION OF TEST

11 *Full-Time and Complete Tests.* The duration of both efficiency and capacity full-time tests of a producer, with the exceptions noted below, should be such that the probable error in weighing the coal does not exceed 2 per cent, or that the total consumption of fuel is at least twice the weight of the fuel contained in the producer when in normal operation, estimating this weight in the case of coal at 45 lb. per cu. ft. In no case should the duration be less than 24 hours after the producer has reached the desired and constant operative temperatures and conditions, except by various agreement. Tests to determine the clinkering tendencies of a fuel and the quality of the ashes will normally require five or more days in large producers.

12 *Intermittent Producers.* In cases which require the fuel bed to be entirely removed and rebuilt at regular intervals, and in producers where a complete cleaning and renewal occurs before the total consumption above stipulated has been reached, the duration should be that of one or more of the regular commercial operating cycles, or the time elapsing between a corresponding number of successive renewals of the fuel bed. The time of starting and stopping may be taken from either immediately after cleaning, or midway between two cleanings, care being taken in the latter case to see that the fuel bed is at the same level in stopping as in starting.

13 *Spot Tests.* Where the cost of making a full-time test is prohibitive, or where for any other reason it is not desired, or where a frequent check is desired on the capacity, efficiency and character of the output of the gas producer at any time, a "spot test" may be made without elaborate preparation, with the use of equipments frequently found in such plants, and with the services of an analytical chemist, provided (*a*) the fuel used, such as anthracite, charcoal, coke and oil, produces negligible amounts by weight of tar or other condensible carbon vapors, and (*b*) the cooling water is recirculated so that it will remain saturated with the CO_2 and other gases being produced.

For this purpose there will be needed an appliance for continuously sampling the gas, say for one hour, or else for taking a series of spot samples; apparatus for analyzing and determining the composition of the gas produced; and either a continuous gas calorimeter or the equivalent. The average heating value of the gas may be calculated from the volumetric analysis of the gas under standard conditions by the use of appropriate values of the calorific power of the constituent gases. The average volumetric analysis for the included period is then converted into an analysis by weight, from which the total weight of carbon in one cubic foot of standard gas may be determined as follows: If the sum of the proportions by volume of CO, CO_2, CH_4, and other carbon compounds containing one atom of carbon be multiplied by 0.03127, and if the sum of the proportions by weight of the C_2H_4, C_2H_6, and other carbon compounds containing two atoms of carbon be multiplied by twice 0.03127, or by 0.06253, and the two products added together, the sum will be the weight of carbon in one cubic foot of the gas at 68 deg. fahr. and 30 in. of mercury = C_5. The ultimate analysis and the calorific value of the coal as actually fired to the producer, and an analysis for the carbon-content of the dried ash will be necessary.

STARTING AND STOPPING

14 The conditions regarding the temperature of the producer and its contents, and the quantity and quality of the latter, especially of the clinker, should be as nearly as possible the same throughout the test, and particularly so at the beginning and at the end of the trial. To secure the desired equality of conditions, the starting and stopping should occur at the conclusion of the times of regular cleanings, and they should be preceded for a period of not less than 8 hours by the same regular working conditions as are intended to characterize the test as a whole. Unless the condition of the fuel bed at the beginning and end of a test can be so accurately determined, and possible differences in level allowed for, so that the error in determining the net weight of fuel used during the test shall not exceed two per cent, the tests should be abandoned as valueless. The operations of starting and stopping should be carried on as follows:

8a *Continuous Producers with Grate and No Ash Bed.* Remove the ash and clinkers from the grate and the lower part of the furnace space, taking care that the crust or closely united layer which supports the fuel above is not unduly disturbed. Then break open the crust and allow the mass to drop into the space left vacant. Introduce a poker rod through the poker holes in the upper head and stir up the fuel within, thereby causing it to settle and fill up the remaining spaces. As a final step, quickly replenish the producer with fuel to the working depth, which should be measured, fill the hopper level full, take the time, and consider this the starting time. Then clean the ash-pit, and thereafter proceed with the regular work of the test, using weighed fuel.

When the time arrives for bringing the trial to a close, the cleaning operations described above should be repeated, ending with filling the hopper, taking the time, and considering this the stopping time; finally removing the ashes and refuse from the ash-pit weighing and sampling them as directed, and replenishing the producer with fuel to the same working depth as at the start.

8b *Continuous Producers with Supporting Ash Beds.* Remove the ashes until the top of the ash bed is lowered to the normal working point. Introduce the poker rod and break down any bridge or crust that may have formed, at the same time closing up the channels that run through the fuel bed, thereby making the bed homogeneous. Then replenish the producer

with fuel to the working depth, which should be measured, to the same working depth as at the start, fill the hopper level full, take the time, and consider this the starting time. Thereafter proceed with the regular work of the test, using weighed fuel.

When the time approaches for ending the test, the operations above described are repeated, ending with replenishing the producer and filling the hopper with weighed fuel, taking the time, and considering this the stopping time. The ashes and refuse finally removed, unless already dry, are to be dried before weighing, if they have been wet down after being removed, otherwise they should be weighed both wet and dry and the water accredited to the water used during the test, or a sample should be taken and the moisture, as determined therefrom, allowed for.

8c *Intermittent Producers.* Thoroughly clean the producer of its entire contents. Introduce a weighed supply of fuel, start the fire, and build up the fuel bed to its working condition, using weighed fuel. When this point is reached, take the time, and consider this the starting time. Thereafter proceed with the regular work of the test.

When the time approaches for ending the test, burn the fuel bed as low as practicable to prepare for cleaning, note the time, and consider this the stopping time. Then completely empty the producer, quench the fire remaining in the live coals, separate and weigh the cake and ash, and deduct the weight of the former from that of the fuel as charged. Finally, dry the ash and refuse or take a sample and allow for the moisture as determined therefrom.

Some idea of the thicknesses of the ash-bed, incandescent-fuel and green-fuel zones may be obtained by the simultaneous use of several rods made of $^3/_8$-in. pipes, having a stop-pin, 3 in. long, inserted two feet from the upper and handled end, and long enough to extend down into the ash pit. These rods should be inserted vertically, through observation holes, or poke holes, in the top of the producer. The top level of the green-coal zone and the height of the fuel in the producer at each place will be shown by the distance that the rod is inserted below the observation hole when resting on the fuel. When forced down through the fuel and to the stop-pin and left there for two or three minutes, and until part of its length gets red-hot, when withdrawn, the red-hot part will show the thickness and position of the incandescent, or fire-zone. The depth of the ash-zone will be the distance from the lower line of visible heat in the rod to the grate blowerhood, or bottom of the producer. The green-fuel zone will be the space above the incandescent zone. Its thickness will be the difference between the distance from the top of the observation hole to the top of the fuel and to the incandescent zone. With tarry fuel, it may be indicated by the tarry deposit on the rod. The gas zone may be noted by the sooty deposit on the upper end of the rod. The average results should be the ones reported.

The depth of the fuel-bed is measured by the distance from the lower line of visible heat in the rod to the top of the green-fuel in the producer.

The distance from the top of the producer to the surface of the fuel bed may be found by direct measurement with the poker rod, noting by sense of touch when the end of the rod reaches the fuel.

The product of the proportion of ash from the sample of coal as fired and the proportion of carbon to net ashes from the sample of ashes and refuse will be the proportion of coal in the carbon of the ashes and refuse, and will be the weight of the carbon lost in the ashes per pound of coal as fired. The carbon lost in the ashes taken from the carbon in the coal as fired will give the weight of carbon passing over in the gas per pound of coal as fired.

If C_1 is the carbon in 1 lb. of coal as fired

C_2 is the carbon in 1 lb. of the ashes and refuse from the producer

A_1 is the ash in 1 lb. of the coal, by analysis, then $\frac{C_2}{1 - C_2}$ is the carbon in 1 lb. of the net ash, and $A_1 \frac{C_2}{1 - C_2} = C_3$ will be the carbon from 1 lb. of coal lost in the ashes, and $C_1 - C_3 = C_4$, the carbon gasified per 1 lb. of coal. The cubic feet of gas made per pound of coal will be the quotient obtained by dividing the carbon gasified per pound of coal by the weight of carbon in 1 cu. ft. of the gas, or C_4/C_5.

The cubic feet of gas per pound of coal multiplied by the B.t.u. per cubic foot of the gas will give the B.t.u. of output per pound of coal. The efficiency of gas making will be

$$E = \frac{C_4 \times \text{B.t.u. per cu. ft. of gas}}{C_5 \times \text{B.t.u. per lb. of coal}}$$

The desired output in B.t.u. per hour divided by the product of the efficiency and the B.t.u. per pound of coal will give the pounds of coal which will have to be fired per hour to generate the desired output. Weighing the coal input over any desired period at steady load will therefore permit the determination of the output capacity.

15 *Spot Tests with Tar-Producing Fuels.* Spot tests may be made when bituminous coals are used, if the tar and soot per cubic foot of the outlet gas are determined. With plants operating on tar-producing and soot-producing fuels, the above methods will apply only where the cooling water is recirculated and the tar and soot are either gasified or separated and determined per foot of gas delivered. Where the tar is wasted, it must first be collected, weighed, sampled, and its weight compared with the weight of fuel used during the same time, so as to determine the amount of tar lost per pound of coal gasified. If the tar and soot per cubic foot of gas are carefully determined, the spot test method can be used with the uncleaned and hot gases from pressure producers.

In case the water is not recirculated, there will be a considerable absorption of CO_2 by the cold water used in washing the gas. The carbon so lost can be determined either by comparing the CO_2 contents of the gas samples taken simultaneously before and after passing the coolers, or by metering the cooling water used and determining by analysis the amount of carbon carried away as CO_2 in the water.

With the use of continuously recording gages, calorimeters, and weighing and sampling devices, it is possible with producers using anthracite coal or charcoal to make spot tests and determine the instantaneous capacity and economy. Because of the simplicity of the equipment required, the decrease in the number of observations to be made, the decrease in the time consumed, and the ability to get quick results with fair accuracy and with no greater precaution than in the conventional heat-balance method, this method of testing a gas producer is commended. It was devised by H. F. Smith, a member of this committee.

16 *Short Tests.* If less complete and less expensive tests are desired than the full time tests given in Table 1, they may be made by determining the weight of the fuel used per day (132) and (133), the ultimate analysis of the fuel (85) to (90) the proximate analysis (80) to (84), the calorific values of the fuel and gas (153) to (156), the temperature and humidity of the air (66) and (50), the temperature, humidity, and pressure of the steam used (42), the analysis of the refuse (91) to (95), the temperature of the gas leaving the producer (63), the analysis of the gas made including the amounts of tar and moisture (141) to (150), (108) and (114).

It will not be necessary in these tests to meter the steam used or the gas made. The volume of gas made is determined by knowing the amount of carbon gasified per hour and the average amount of carbon in 1 cu. ft. of gas as it leaves the producer, including the carbon in the tar and soot. The amount of water vapor coming from all sources must equal the water equivalent to the hydrogen, both free and combined, in the gas, tar, and water going into the gas-main from the producer. Knowing the amount of hydrogen coming from the fuel and the amount coming from the moisture in the air; the remainder will equal the hydrogen entering the producer as steam from the boiler, and as vapor from the ash pit, water seal, and elsewhere. From these data the gas and tar produced per ton of coal and the total heat in the gas, both sensible and potential, and the thermal efficiency can be calculated.

Records

See also Code on Fuels, and Code on Instruments and Apparatus.

17 *Ashes and Refuse.* See Code on Fuels, and Code on Instruments and Apparatus.

18 *Calorific Tests and Analyses of Fuel.* See Code on Fuels, and Code on Instruments and Apparatus.

19 *Analyses and Calorific Tests of Fuels.* The quality of the gas should be determined by calorimetric test or chemical analysis or both. Continuous samples for the purpose should be taken from the delivery pipe at a point near the producer and at other points as may be needed. The calorimetric test should be made with a Junkers type of calorimeter, described in the Code on Instruments and Apparatus, or its equivalent. For an approximate determination of the composition of the gas, the Orsat apparatus may be used, and for a complete determination, the Hempel apparatus or its equivalent. These are described in the Code on Instruments and Apparatus. The frequency with which these determinations should be made depends on the uniformity of the output, but the intervals, where practicable, should not be more than one-half hour, the time taken for collecting each sample being not less than one-quarter hour.

Calculation of Results

20 *Total Volume of Gas Delivered.* The volume of gas as measured by the pitot meter is determined by multiplying the effective

area of the delivery pipe in sq. ft. at the tube by the average velocity of the gas in feet per minute over that area, and the product by the duration of the trial in minutes.

The equivalent volume at standard atmospheric pressure of 30 in. of mercury and standard temperature of 68 deg. fahr. is obtained by multiplying the measured volume by the absolute pressure of the gas in lb. per sq. in. (gage pressure plus 14.74 or the equivalent barometric pressure) and by the constant 35.82 (527.6/14.74), and dividing the product by the absolute temperature of the gas (temperature by thermometer plus 459.6 deg.).

The gas as it leaves the scrubber is saturated with water vapor at the pressure due to its temperature, and this pressure is to be deducted from the absolute pressure, as observed, to obtain the net pressure of dry gas. The volume of dry gas in that case is obtained by the following formula:

$$V = V_s \times \frac{P - P_w}{P_a} \times \frac{528}{t + 460}$$

in which V = equivalent volume of dry gas at 68 deg. and 30 in. leaving scrubber

V_s = observed volume of gas leaving the scrubber

P = absolute pressure at the point where the volume is measured

P_w = pressure of saturated water vapor at temperature t

P_a = atmospheric pressure (14.74 lb. per sq. in., or 30 in. of mercury)

t = observed temperature of gas leaving scrubber.

P and P_w are to be taken in the same units as P_a.

The volume of dry gas delivered by a gas producer can be obtained by calculation from the analyses of the fuel and of the dry gas, by the following method:

Dry gas per lb. carbon

$$= \frac{11CO_2 + 8O + 7(CO + N + C_2H_4) + 4CH_4 + 0.5H}{3(CO_2 + CO + CH_4 + 2C_2H_4)}$$

in which CO_2, O, CO, H, CH_4, C_2H_4, and N are percentages of the dry gas per lb. Multiplying the lb. of gas per lb. of carbon by the percentage of carbon in the fuel and dividing by 100 gives the weight of dry gas per lb. of fuel and the volume of gas per lb. of fuel is found by dividing this weight by the weight of one cubic foot of the gas calculated from the analysis as shown in Par. 22 below.

The weight of carbon per 100 cu. ft. of gas at 30 in. and 68 deg. fahr. can be found directly from the analysis by multiplying the per cent by volume of each gas containing carbon by the pounds of carbon in 1 cu. ft. of the gas as follows:

$$CO + CO_2 \times 0.03126$$
$$CH_4 \times 0.03128$$
$$C_2H_4 \times 0.06253$$

and adding the results together. The volume of clean gas delivered per pound of fuel may be found by subtracting the sum of the weights of carbon in the tar, soot and ashes, and refuse per pound of fuel from the weight of carbon in a cu. ft. of gas, all at the same temperature and pressure.

21 *Net Volume of Dry Gas Delivered.* The net volume of dry gas delivered is found by subtracting from the total volume the volume of gas that would be required for furnishing steam or power for any purposes concerned in the operation of the producer and its auxiliaries.

22 *Gross Weight of Dry Gas.* The weight of dry gas delivered is found by multiplying the volume in cu. ft. reduced to 68 deg. and 30 in. pressure, by the weight per cu. ft. of dry gas, which is found by multiplying the percentage of each component gas as found by analysis by its weight in lb. per cu. ft. at 68 deg. and 30 in., as given in the following table (calculated from Landolt and Bornstein's figures at 32 deg. and 29.92 in.), and dividing the sum of the products by 100.

H.....	0.00533	CO_2.....	0.11633
O.....	0.08460	CH_4.....	0.04243
N.....	0.07408	C_2H_4.....	0.07411
CO.....	0.07402	SO_2.....	0.16940

23 *Calorific Value of Gas.* The calorific value of the dry gas per cu. ft. is obtained by means of a Junkers type of calorimeter (See Code on Instruments and Apparatus), but it may also be obtained from the analysis by multiplying the percentage of each combustible constituent gas by its heating value per cu. ft. at 68 deg. and 30 in. as given below:

CO.....	317.8	CH_4.....	1002.1
H.....	329.9	C_2H_4.....	1595

These figures are the product of the above values of weight of gas per cu. ft. by the heating value of one pound of gas, according to Thomsen.

24 *Moisture in Gas.* The moisture in the gas leaving the producer is found by passing a measured sample of the gas through a chloride of calcium tube and weighing the amount of moisture absorbed.

The moisture in the gas leaving the scrubber is best found by calculation assuming that the gas is saturated with moisture. The calculation is made in the manner pointed out in Par. 14*a*.

25 *Percentage of Tar and Soot in Gas.* The percentage of tar and soot is found by comparing the total weight determined, including that collected from the various tar drips, with the total weight of dry fuel used. (Paragraph to be extended.)

26 *Sensible Heats.* The sensible heat of the gas as delivered is the sum of the products of the constituents of the gas delivered per pound of dry fuel by their respective volumetric specific heats and the total heat of the moisture content above 68 deg. fahr. The sensible heat of the coal is the product of its specific heat per pound by the temperature difference of the coal, or surrounding air above or below 68 deg. fahr.

27 *Efficiency.* The efficiency is the ratio of the calorific value of the gross dry gas per lb. of net dry fuel charged (that is, gross dry fuel less the fuel recovered, or unburnt fuel withdrawn from the producer during or at the end of the test), or of net combustible, and the calorific value of 1 lb. of dry fuel, or of combustible, respectively. The former is ascertained by multiplying the B.t.u. per cu. ft. of gross dry gas as determined by the calorimetric test by the cu. ft. of net dry gas delivered, and dividing the product by the total net weight of dry fuel charged, or of combustible, respectively.

When the producer is supplied with steam from an outside source, rather than from its own vaporizer, for the generation of gas, the total heat used to generate the steam so supplied should be added to the heat of the fuel supplied in the same length of time to determine the efficiency.

The combustible is determined by subtracting from the weight of charged fuel the moisture in the coal and the weight of ash refuse and unburned fuel withdrawn from the producer or ash pit during or at the end of the test. The "combustible" used for determining the calorific value is the weight of the fuel less the moisture and ash found by analysis.

The "efficiency of conversion and cleaning," or "gross efficiency" in the above calculation is found by using the total gross volume of dry gas delivered. The "efficiency of the plant" or "net efficiency" is found by using the net volume of dry gas delivered. By net volume is meant the gross volume less the actual gas used, or the equivalent, to operate the auxiliaries; that is, the net volume is the amount of gas available for sale or for uses outside of the producer plant.

The "cold-gas efficiency" is the sum of the products of the constituent parts of the cold gas delivered per pound of dry fuel by their higher heating values divided by the sum of the heating value of a pound of the fuel used in the producer and the heating value of the fuel used to generate the steam supplied from an outside source per pound of the fuel used in the producer.

The "hot-gas efficiency" is obtained by adding to the potential heat of the cold coal gas as above stated the sensible heat of the gas as determined in Par. 26, and divided by the sum of the higher heating value of a pound of the fuel and the heating value of the fuel used to generate the steam supplied from an outside source per pound of the fuel used in the producer.

Unless otherwise stated, the higher heating value should always be used. If the lower, or net, heating value is used, it should always be noted, so as not to cause confusion in results.

The "cold-gas" and "hot-gas" efficiencies, both "gross" and "net," should be determined for both the higher and the lower heating values for the gas.

28 *Heat Balance.* The various quantities showing the distribution of heat in the heat balance given in Table 1 are computed in the following manner:

The heating value of the dry gas is found by multiplying the cubic feet of gas at 68 deg. and 30 in. per pound of dry fuel by the higher heating value of 1 cu. ft. of gas at 68 deg. and 30 in.

The sensible heat in the dry gas is found by multiplying the weight of gas per pound of fuel by the mean specific heat of the gas and by its temperature measured above 68 deg.

The heat carried away by the scrubber is obtained by multiplying the weight of water fed to the scrubber by the number of degrees rise of temperature, and dividing the product by the total weight of dry fuel consumed.

The heat contained in the moisture leaving the producer is found by multiplying the total weight of dry gas per pound of dry fuel by the proportion of moisture in the gas and by the total heat of 1 lb. of superheated steam at the temperature of the gas leaving the producer reckoned from 68 deg. and at net pressure.

The loss due to combustible matter in the ashes and refuse is found by multiplying the proportion that this combustible bears to the whole amount of dry fuel by 14,600 B.t.u. The heating value of the combustible matter in the ashes and refuse should be determined by a calorimeter, as a check.

In the case of those producers which are supplied with steam from a separately fired-boiler, rather than solely from the vaporizer of the producer from the sensible heats of the gases generated, either the fuel used in operating the boiler per pound of the fuel used in the producer, or the total heat of the steam as delivered to producer, divided by a known, or assumed, efficiency of the boiler, should be included in the potential heats delivered to the producer, and should be used in calculating the efficiencies.

In those producers where tar, soot, and ammonia are recovered, along with the gas, the amounts of same should be included and reported in the output, and their net values deducted from the financial report of the cost of making gas.

DATA AND RESULTS

29 The data and results should be reported in accordance with the form given in Table No. 2, adding lines for data not provided for or omitting those not required, as may conform to the objects in view. Unless otherwise indicated, the items should be the averages of the observed data and results.

In trials having for an object the determination and exposition of the complete performance from beginning to end, the entire logs of readings and data should be plotted on charts and represented graphically.

TABLE I DATA AND RESULTS OF GAS-PRODUCER TEST
A.S.M.E. Code of 1923

GENERAL INFORMATION

(1)	Date of Test	
(2)	Location	
(3)	Owner's name and address	
(4)	Builder's name and address	
(5)	Test conducted by	
(6)	Object of Tests	

DESCRIPTION, DIMENSIONS, ETC., OF GAS PRODUCER

(7)	Type of producer	
(8)	Rated size, power, or capacity of producer	
(9)	Duration of test	
(10)	Trade name, kind, and size of solid fuel	
(11)	Trade name and kind of oil fuel	
	(*a*) Oil fuel, specific gravity at 68 deg. fahr.	deg. Baumé
	(*b*) Oil fuel, specific gravity	referred to water
	(*c*) Oil fuel, weight per gal. at 68 deg. fahr.	lb.
(12)	Outside diameter and height of producer	ft.
(13)	Inside diameter at hearth	ft.
(14)	Maximum inside diameter of lining of producer	ft.
(15)	Minimum inside diameter of lining of producer	ft.
(16)	Actual net diameter of the gasification zone	ft.
(17)	Height from lowest level of grate to crown	ft.
(18)	Height from lowest level of grate to center of gas outlet	ft.
(19)	Vertical distance between highest and lowest levels of inclined grate	ft.
(20)	Gross diameter of grate	ft.
(21)	Corresponding projected area of grate	sq. ft.
(22)	Gross diameter of central air-inlet through grate	ft.
(23)	Corresponding area of same	sq. ft.
(24)	Gross area of grate, if inclined	sq. ft.
(25)	Area of air spaces in grate	sq. ft.
(26)	Ratio of air spaces in grate to net, or gross, grate area	sq. ft.
(27)	Diameter of steam-blast inlet	in.
(28)	Corresponding area of same	sq. in.
(29)	Type of blower used	
(30)	Diameter of steam pipe to blast inlet, or blower	in.
(31)	Diameter of gas outlet	in.
(32)	Corresponding area of same	sq. in.
(33)	Area of fuel bed at maximum diameter	sq. ft.
(34)	Actual net area of fuel-bed at gasification zone	sq. ft.
(35)	Area of water heating surface in vaporizer	sq. ft.
(36)	Method of poking producer	
(37)	Method of rotating producer	
(38)	Method of generating steam for producer	
(39)	Method of cooling gas	
(40)	Method of scrubbing and purifying gas	
(41)	Method of supplying water for cooling and cleaning	

TEST DATA AND RESULTS

Pressures

(42)	Steam pressure boiler, or vaporizer, or as delivered to producer by gage	lb. per sq. in.
(43)	Gas pressure, or suction, in main at point where gas is measured	in. of water
(44)	Pressure, or suction, at top of producer	in. of water
(45)	Pressure, or suction, beyond scrubber	in. of water
(46)	Pressure, or suction, beyond purifier	in. of water
(47)	Draft pressure, or suction, in ash pit or in bottom of producer	in. of water
(48)	Barometric pressure of atmosphere	in. of mercury at deg. fahr.
(49)	Barometric pressure of atmosphere in inches of mercury at 32 deg. fahr.	

Miscellaneous

(50)	Relative humidity of air	per cent
(51)	Humidity of steam as delivered to the producer	per cent wet
(52)	Average depth of fuel-bed	
(53)	Average depth of ash-bed	
(54)	Number of cleanings	
(55)	Average duration of each cleaning	
(56)	Average intervals between cleanings	
(57)	Average length of cleanings	
(58)	Average intervals between pokings	
(59)	Average length of pokings	
(60)	Ashes wet or dry	lb.

Temperatures

(61)	Temperature of feedwater entering vaporizer of producer	deg. fahr.
(62)	Temperature of feedwater entering outside steam generator	deg. fahr.
(63)	Temperature of gas leaving producer	deg. fahr.
(64)	Temperature of tar and soot as delivered	deg. fahr.
(65)	Temperature of gas in main at point where gas is measured	deg. fahr.
(66)	Temperature of air in room	deg. fahr.
(67)	Temperature of air entering the producer	deg. fahr.
(68)	Temperature of gas entering scrubber	deg. fahr.
(69)	Temperature of gas leaving scrubber	deg. fahr.
(70)	Temperature of gas entering purifier	deg. fahr.
(71)	Temperature of gas leaving purifier	deg. fahr.
(72)	Temperature of water entering scrubber	deg. fahr.
(73)	Temperature of water leaving scrubber	deg. fahr.
(74)	Temperature of water entering purifier	deg. fahr.
(75)	Temperature of water leaving purifier	deg. fahr.
(76)	Temperature of cooling water entering producer	deg. fahr.
(77)	Temperature of cooling water leaving producer	deg. fahr.
(78)	Temperature of ashes when being removed	deg. fahr.
(79)	Temperature of steam delivered to producer	deg. fahr.

Proximate Analysis of Coal Supplied to Producer

(80)	Moisture	per cent
(81)	Volatile matter and its nature	per cent
(82)	Fixed carbon	per cent
(83)	Ash	per cent
(84)	Sulphur, separately determined	per cent
		100 per cent

Ultimate Analysis of Dry Coal	*As Fired*	*Dry Coal*
(85) Carbon (C)	per cent	per cent
(86) Hydrogen (H_2)	per cent	per cent
(87) Oxygen (O_2)	per cent	per cent
(88) Nitrogen (N_2)	per cent	per cent
(89) Sulphur (S)	per cent	per cent
(90) Ash	per cent	per cent
		100 per cent

Analysis of Ash and Refuse

(91) Carbon ..... per cent
(92) Earthy matter ..... per cent
(93) Moisture ..... per cent
(94) Fusing temperature of ash ..... deg.
(95) Nature and texture of ash .....

TOTALS AND HOURLY QUANTITIES AND RATES

Total Quantities

(96) Gross weight of fuel charged corrected for estimated differences in weights of fuel in producer at beginning and end of test ..... lb.
(97) Percentage of moisture in fuel ..... per cent
(98) Net weight of dry fuel ..... lb.
(99) Volume of air entering producer ..... cu. ft.
(100) Its humidity ..... grains per cu. ft.
(101) Weight of dry air entering producer ..... lb.
(102) Ashes and refuse, wet or dry ..... lb.
(103) Percentage of dry ashes and refuse from dry coal ..... per cent
(104) Net combustible (Item 98–Item 102) ..... lb.
(105) Unburnt carbon in one lb. of dry ash and refuse ..... lb.
(106) Number of cu. ft. of gross gas delivered ..... cu. ft.
(107) Specific gravity of dry gas .....
(108) Weight of dry gas delivered ..... lb.
(109) Moisture in gas leaving producer, mixed with 1 lb. of dry gas ..... lb.
(110) Moisture in gas leaving scrubber, mixed with 1 lb. of dry gas ..... lb.
(111) Equivalent cu. ft. of dry gas at temperature of 68 deg. and pressure 30 in. of mercury ..... cu. ft.
(112) Net cu. ft. of dry gas at 68 deg. and 30 in. ..... cu. ft.
(113) Weight of tar and soot delivered ..... lb.
(114) Percentage of tar and soot in gas referred to dry fuel ..... per cent
(115) Residual tar and soot in clean dry gas ..... grains per cu. ft.
(116) Water supplied to ashpit and water seal ..... lb.
(117) Water supplied to vaporizer or boiler ..... lb.
(118) Water supplied as moisture in fuel ..... lb.
(119) Water supplied as moisture in air ..... lb.
(120) Cooling water supplied to ash pit and water seal ..... lb.
(121) Total water supplied to fuel bed ..... lb.
(122) Water evaporated in vaporizer ..... lb.
(123) Steam supplied to producer ..... lb.
(124) Cooling water supplied to producer ..... lb.
(125) Water supplied to scrubber ..... lb.
(126) Water supplied to purifier ..... lb.
(127) Total water supplied to generate steam for producer ..... lb.
(128) Water supplied to generate steam for steam pumps ..... lb.
(129) Water supplied for other auxiliaries ..... lb.
(130) Total weight of water supplied to producer and its auxiliaries ..... lb.
(131) Heat supplied to producer as steam from vaporizer, or from separately fired boiler .....
(132) Dry fuel gasified ..... lb.
(133) Dry fuel per sq. ft. of main fuel bed ..... lb.
(134) Power required for auxiliaries, mechanical or electrical ..... hp. or kw. per hr.
Supplying air, as by turbo-blower, lb. of steam, or kw. per hr.
Water pumps .....
Tar pumps .....
Scrubbers .....
Purifiers .....
Poking fire .....
Rotating producer .....
Exhauster .....
For charging producer .....
Total power, mechanical or electrical .....
(135) Fuel supplied to auxiliary boiler for supplying steam to the producer ..... lb.
(136) Fuel supplied to the pumps which supply water to the producer, scrubber and purifier ..... lb.
(137) Fuel supplied to the producer for gas-making ..... lb.
(138) Total fuel supplied to the plant and its auxiliaries ..... lb.
(139) Manual labor
Labor supplied for generating steam ..... men-hours
Labor supplied for charging producers ..... men-hours
Labor supplied for poking fire ..... men-hours
Labor supplied for rotating producer ..... men-hours
Labor supplied for cleaning producer ..... men-hours
Labor supplied for operating auxiliaries ..... men-hours
Labor supplied for other operations ..... men-hours
Total labor supplied for operating plant ..... men-hours
(140) Rate of pay of manual labor
Rate of pay of labor supplied for generating steam ..... cts.
Rate of pay of labor supplied for charging producers ..... cts.
Rate of pay of labor supplied for poking fire ..... cts.
Rate of pay of labor supplied for rotating producer ..... cts.
Rate of pay of labor supplied for cleaning producer ..... cts.
Rate of pay of labor supplied for operating auxiliaries ..... cts.
Rate of pay of labor supplied for other operations ..... cts.
(141) Costs of manual labor
Cost of labor supplied for generating steam ..... dollars
Cost of labor supplied for charging producer ..... dollars
Cost of labor supplied for poking fire ..... dollars
Cost of labor supplied for rotating producer ..... dollars
Cost of labor supplied for cleaning producer ..... dollars
Cost of labor supplied for operating auxiliaries ..... dollars
Cost of labor supplied for other operations ..... dollars
Total cost of labor supplied for operating the plant ..... dollars

Analysis of Dry Gas by Volume

(142) Carbon dioxide (CO_2) ..... per cent
(143) Carbon monoxide (CO) ..... per cent
(144) Oxygen (O_2) ..... per cent
(145) Hydrogen (H_2) ..... per cent
(146) Methane, or marsh gas (CH_4) ..... per cent
(147) Ethylene, or olefiant gas (C_2H_4) ..... per cent
(148) Hydrogen sulphide (H_2S) ..... per cent
(149) Sulphur dioxide (SO_2) ..... per cent
(150) Ammonia (NH_3) ..... per cent
(151) Nitrogen (N_2) by difference ..... per cent
(152) Total combustible in dry gas ..... per cent

Calorific Values by Calorimeter

(153) Higher heating value of 1 lb. of fuel as fired ..... B.t.u.
(154) Higher calorific value of 1 lb. of dry fuel ..... B.t.u.
(155) Higher calorific value of 1 lb. of combustible by analysis ..... B.t.u.
(156) Higher calorific value of 1 cu. ft. of dry gas at 68 deg. and 30 in. ..... B.t.u.
(157) Lower calorific value of 1 cu. ft. of dry gas at 68 deg. and 30 in. ..... B.t.u.
(158) Equivalent cu. ft. of gross dry gas at 68 deg. and 30 in. per lb. of dry fuel ..... cu. ft.
(159) Equivalent cu. ft. of gross dry gas at 68 deg. and 30 in. per lb. of combustible ..... cu. ft.
(160) Equivalent net cu. ft. of net dry gas at 68 deg. and 30 in. per lb. of combustible ..... cu. ft.

Efficiencies

(161) Gross efficiency of producer, based on coal as fired and steam ..... per cent
(162) Net efficiency of producer, based on coal as fired and steam ..... per cent
(163) Gross efficiency of producer, based on dry fuel, or on fuel and steam ..... per cent
(164) Net efficiency of producer based on dry fuel or fuel and steam ..... per cent
(165) Gross efficiency of producer, based on combustible, or on combustible and steam ..... per cent
(166) Net efficiency of producer, based on combustible, or on combustible and steam ..... per cent

Costs of Fuel and Labor

(167) Cost of fuel per ton of ..... lb., or per gallon, delivered at plant ..... dollars
(168) Cost of fuel per ton of ..... lb., or per gallon, delivered at charging platform ..... dollars
(169) Cost of fuel required for producing 1000 net cu. ft. of dry gas at 68 deg. and 30 in. ..... dollars
(170) Cost of fuel for producing 1,000,000 B.t.u. ..... dollars
(171) Cost of labor per ton of ..... lb., or per gallon, delivered at plant ..... dollars
(172) Cost of labor per ton of ..... lb., or per gallon, delivered at charging platform ..... dollars
(173) Total cost of fuel and labor per ton of ..... lb., or per gallon of fuel gasified ..... dollars
(174) Cost of labor for producing 1000 net cu. ft. of dry gas at 68 deg. and 30 in. ..... dollars
(175) Cost of labor for producing 1,000,000 B.t.u. of potential heat in net gas ..... dollars

Heat Balance Based on 1 lb. of Dry Fuel and the Products Therefrom

(176) Higher calorific value of 1 lb. of dry fuel (Item 85) ..... B.t.u., = 100 per cent
(177) Higher calorific value of dry gas (Item 87 × Item 89) ..... B.t.u., = ... per cent
(178) Sensible heat in hot dry gas above 68 deg. fahr. ..... B.t.u., = ... per cent
(179) Total heat of moisture in gas above 68 deg. fahr. ..... B.t.u., = ... per cent
(180) Heat removed by water of scrubber ..... B.t.u., = ... per cent
(181) Heat removed by purifier ..... B.t.u., = ... per cent
(182) Heat lost in residual tar and soot of dry gas ..... B.t.u., = ... per cent
(183) Heat lost as unburnt fuel in ash ..... B.t.u., = ... per cent
(184) Heat lost by radiation and otherwise unaccounted for (Item 144 minus sum of Items 145 to 152, both inclusive ..... B.t.u., = ... per cent
(185) Sensible heat of fuel above or below 68 deg. fahr. ..... B.t.u., = ... per cent
(186) Sensible heat of air above or below 68 deg. fahr. ..... B.t.u., = ... per cent
(187) Total heat above 68 deg. fahr. in water and steam supplied ..... B.t.u., = ... per cent
(188) Sensible heat of ashes and refuse ..... B.t.u., = ... per cent
(189) Heat lost to cooling water in producer ..... B.t.u., = ... per cent

When steam is supplied to producer from an outside source, the data and results should be modified accordingly.

Report on Code for Unfired Pressure Vessels

Final Report; to be Printed and Issued as "Rules for the Construction of Unfired Pressure Vessels" Unless Criticisms are Received Which, in the Opinion of the Boiler Code Committee and the Council of the A.S.M.E., Will Warrant Changes

A.S.M.E. Boiler Construction Code

Section VIII

TO THE BOILER CODE COMMITTEE OF THE AMERICAN SOCIETY OF MECHANICAL ENGINEERS:

GENTLEMEN:

The object of the code covering the construction of Unfired Pressure Vessels is to provide a safe construction for the great variety of pressure containers now manufactured and used for innumerable purposes throughout the country and under an exceedingly wide range of conditions. The efforts to give publicity which have been made in order to obtain as wide a range of opinion as possible, have brought out views which were often times diametrically opposed. In such cases the attempt has been made to frame the rules in accordance with the greater weight of opinion.

It is believed that these rules will not work undue hardship on the manufacturing industries generally, and at the same time will result in the construction of reasonably safe pressure vessels, for it is undoubtedly true that many of the failures which take place are due to the lack of proper restrictions governing both material, workmanship, dimensions and supervision.

Rules for electric induction compression welding are in process of preparation and will be submitted later on for addenda to the Code.

Respectfully submitted:

E. R. FISH, *Chairman* — S. F. JETER
WM. H. BOEHM — WM. F. KIESEL, JR.
C. E. BRONSON — JAMES NEIL
E. C. FISHER — H. V. WILLE.

Report on Rules for the Construction of Unfired Pressure Vessels

These rules do not apply (a) to boilers and other pressure vessels which are subject to Federal inspection and control, (b) to locomotives of all types, (c) to vessels for containing only water under pressure for domestic supply, (d) to vessels subject to temperatures exceeding 750 deg. fahr.

U-1. The Rules in this Section apply to Unfired Pressure Vessels over 6 in. in diameter, more than 1.5 cu. ft. in volume and carrying a pressure of over 30 lb. per sq. in., constructed of steel or iron plates.

SAFETY APPLIANCES

U-2. All pressure vessels shall be protected by such safety and relief valves and indicating and controlling devices as will insure their safe operation. These devices shall be so constructed, located, and installed that they cannot readily be rendered inoperative. The relieving capacity of safety valves shall be such as to prevent a rise of pressure in the vessel of more than 10 per cent above the maximum allowable working pressure, and their discharges shall be carried to a safe place.

U-3. Safety valves shall be of the direct spring-loaded type, with seat and bearing surface of the disk inclined at an angle of about 45 deg., or about 90 deg. to the center line of the spindle; designed with a substantial lifting device so that the disk can be lifted from its seat with the spindle not less than one-eighth the diameter of the valve when the pressure on the vessel is 75 per cent of that at which the safety valve is set to blow.

U-4. Safety valves having either the seat or disk of cast iron shall not be used.

U-5. If more than one safety valve is used, the discharge capacity shall be taken as the combined capacity of all the valves.

U-6. Each safety valve shall have full-sized direct connection to the vessel. When an escape pipe is used, it shall be full-sized and fitted with an open drain, to prevent water from lodging in the upper part of the safety valve or escape pipe. When two or more safety valves are placed on one connection, this connection shall have a cross-sectional area equal to or greater than the combined area of these safety valves. No valve of any description shall be placed between the safety valve and the vessel, nor on the escape pipe between the safety valve and the atmosphere. When an elbow is placed on an escape pipe, it shall be located close to the safety-valve outlet, or the escape pipe shall be securely anchored and supported.

U-7. Every safety valve which is exposed to a temperature of 32 deg. fahr., or less, shall have a drain at least 3/8 in. in diameter at the lowest point where water can collect, to prevent freezing.

U-8. Safety-valve springs shall not be adjusted to carry more than 10 per cent greater pressure than that for which the springs were made.

U-9. Each safety valve shall be tested once every day, or oftener, by raising the disk from its seat.

U-10. Safety valves for compressed-air tanks shall not exceed 3 in. in diameter and shall be proportioned for the maximum number of cubic feet of free air that can be supplied per minute as shown in Table U-1.

U-11. Corrosive Chemicals. All pressure vessels which are to contain substances having a corrosive action upon the metal of which the vessel is constructed, shall be designed for the pressure they are to carry, and the thickness of all parts subject to corrosion should be increased by a uniform amount to safeguard against early rejection.

MATERIAL

U-12. Plates for any part of a riveted vessel required to resist stress produced by internal pressure, shall be of flange- or firebox-quality steel conforming with the Specifications for Boiler Plate Steel given in the Rules for Power Boilers, except as provided in Par. U-13.

U-13. Steel plates for any part of a pressure vessel which is to be constructed with other than riveted joints, or with any combination of riveted and other joints herein considered, shall be of the quality specified for the particular kind of joint used.

U-14. In determining the maximum allowable working pressure, the maximum allowable working stress as herein provided shall be used in the computations.

U-15. For resistance to crushing of steel plate, the maximum allowable stress shall be 19,000 lb. per sq. in. of cross-sectional area.

U-16. In computing the maximum allowable stress on rivets in shear, the following values in pounds per square inch of the cross-sectional area of the rivet shank shall be used:

Iron rivets in single shear	7,600
Iron rivets in double shear	15,200
Steel rivets in single shear	8,800
Steel rivets in double shear	17,600

TABLE U-1 MAXIMUM FREE AIR SUPPLIED IN CUBIC FEET PER MINUTE FOR DIFFERENT SIZES OF SAFETY VALVES AT STATED PRESSURES

Diameter of Valve	Gage Pressure (Pounds)															
(In.)	50	100	150	200	250	300	350	400	500	600	800	1000	1200	1600	2000	2400
1/4	...	...	...	...	...	...	...	53	61	70	84	97	109	128	147	160
1/2	20	32	42	51	59	67	74	111	129	147	177	205	230	270	304	330
3/4	37	59	78	96	112	127	141	176	224	232	242	346	386	423	474	518
1	58	94	124	152	178	202	224	248	286	324	390	450	500	586	...	...
1 1/4	84	135	180	221	257	293	325	...	374	...	509	...	...	...	...	...
1 1/2	114	186	248	302	354	400	444	...	472	...	634	...	...	...	...	...
2	189	306	410	501	592	668	741	...	...	...	...	...	...	...	...	...
2 1/2	282	457	613	750	880	998	1114	...	...	...	...	...	...	...	...	...
3	393	638	856	1050	1230	1398	1557	...	...	...	...	...	...	...	...	...

The foregoing table is based on the following formulas:

$$Q = 28\,PDl \text{ for 45-deg. bevel-seat valves}$$

and

$$Q = 40\,PDl \text{ for flat-seat valves}$$

where

Q = discharge in cubic feet of free air per minute.
P = absolute pressure at which the safety valve opens (gage pressure plus 14.7 lb. at sea level).
D = diameter, in inches, of the inside edge of the bearing surface between the disk and seat.
l = vertical lift of the safety-valve disk from its seat, in inches, representing the lift for minimum discharge capacity, for satisfactory operation of the valve.

The cross-sectional area used in the computations shall be that of the rivet shank after driving.

CONSTRUCTION AND MAXIMUM ALLOWABLE WORKING PRESSURES

U-17. For all pressure vessels the minimum thicknesses of shell plates, heads and dome plates after flanging shall be as follows:

When the Diameter of Shell is		
14 in. and under	Over 14 in. to 24 in.,	Over 24 in. to 36 in.,
1/8 in.	3/16 in.	1/4 in.
Over 36 in. to 54 in.,	Over 54 in. to 72 in.,	Over 72 in.,
5/16 in.	3/8 in.	1/2 in.

except that for riveted construction the minimum thickness shall be 5/16 in.

U-18. The minimum thicknesses of butt straps for double-strap riveted joints shall be as given in Table U-2. Intermediate values shall be determined by interpolation. For plate thicknesses exceeding 1 1/4 in. the thickness of the butt straps shall be not less than two-thirds of the thickness of the plate.

TABLE U-2 MINIMUM THICKNESSES OF BUTT STRAPS

Thickness of shell plates, in.	Minimum thickness of butt straps, in.	Thickness of shell plates, in.	Minimum thickness of butt straps, in.
3/16	3/16	17/32	7/16
7/32	1/4	9/16	7/16
1/4	1/4	5/8	1/2
9/32	1/4	3/4	1/2
5/16	1/4	7/8	5/8
11/32	1/4	1	11/16
3/8	5/16	1 1/8	3/4
13/32	5/16	1 1/4	7/8
7/16	3/8	..	..
15/32	3/8	..	..
1/2	7/16	..	..

U-19. The maximum allowable working pressure is that at which a pressure vessel may be operated.

Where the term "maximum allowable working pressure" is used it refers to gage pressure, or the pressure above the atmosphere, in pounds per square inch.

U-20. For Internal Pressure. The maximum allowable working pressure on the shell of a pressure vessel shall be determined by the strength of the weakest course, computed from the thickness of the plate, the efficiency of the longitudinal joint, the inside diameter of the course, and the maximum allowable unit working stress.

$\frac{S \times t \times E}{R}$ = maximum allowable working pressure, lb. per sq. in.

where S = maximum allowable unit working stress in lb. per sq. in.
= 11,000 lb. per sq. in. for steel plate stamped 55,000 lb. per sq. in. and 10,000 lb. per sq. in. for steel plate stamped less than 55,000 lb. per sq. in. and 9000 lb. for material used in seamless shells

t = minimum thickness of shell plates in weakest course, in.

E = efficiency of riveted longitudinal joint, per cent

R = inside radius of the weakest course of the shell, in., provided the thickness of the shell does not exceed 10 per cent of the radius. If the thickness is over 10 per cent of the radius, the outside radius shall be used.

NOTE: When the safe working pressure for welded or brazed vessels is to be determined, E will be omitted from the formula and the values for S in Pars. U-68, U-82, or U-94 will be substituted for the values given above. For seamless shells, E equals 100 per cent.

JOINTS

U-21. The joints of pressure vessels, if of riveted construction, shall conform to the requirements of Pars. U-26 to U-35.

U-22. Pressure vessels may be fabricated by means of fusion or forge welding, or brazing, provided the rules governing the method adopted and as given in Pars. U-67 to U-96 of the Code are followed, except that base metal of flange or firebox qualities as given in the Rules for Power Boilers may be used.

U-23. Pressure vessels shall not be fabricated by means of fusion welding under the rules given in Pars. U-67 to U-79, inclusive, except:

a. Air vessels, when the diameter does not exceed 20 in., the length does not exceed 3 times the diameter, and the working pressure does not exceed 100 lb. per sq. in.

b. Other vessels, under these rules, in which the circumferential joints only may be welded, when the inside diameter does not exceed 48 in.

U-24. Pressure vessels may be fabricated by means of forge welding when the rules given in Pars. U-80 to U-90 are followed.

U-25. Pressure vessels for use at any temperatures not exceeding 406 deg. fahr., may be fabricated by means of the brazing process when the rules given in Pars. U-91 to U-96 are followed.

RIVETED JOINTS

U-26. The efficiency of a joint is the ratio which the strength of the joint bears to the strength of a solid plate. In the case of a riveted joint this is determined by calculating the breaking strength of a unit section of the joint, considering each possible mode of failure separately, and dividing the lowest result by the breaking strength of a length of a solid plate equal to that of the section considered.

U-27. The distance between the center lines of any two adjacent rows of rivets, or the "back pitch" measured at right angles to the direction of the joint, shall have the following minimum values:

(*a*) If $\frac{P}{d}$ is 4 or less, the minimum values shall be $1\frac{3}{4}\,d$

(*b*) If $\frac{P}{d}$ is over 4, the minimum value shall be:

$$1\frac{3}{4}\,d + 0.1(P - 4d)$$

where P = pitch of rivets in outer row when a rivet in the inner row comes midway between two rivets in the outer row, in.
= pitch of rivets in the outer row less pitch of rivets in the inner row when two rivets in the inner row come between two rivets in the outer row, in. (It is here assumed that the joints are of the usual construction when the rivets are symmetrically spaced.)

d = diameter of the rivet holes, in.

U-28. On longitudinal joints, the distance from the centers of rivet holes to the edges of the plates, except rivet holes in the ends of butt straps, shall be not less than 1 1/2 and not more than 1 3/4 times the diameter of the rivet holes; this distance to be measured from the center of the rivet holes to the top of the calking edge of the plate before calking. The corresponding distance for circumferential seams shall be not less than 1 1/4 times the diameter of the rivet holes.

U-29. a. The strength of circumferential joints of pressure vessels the heads of which are not stayed by tubes or through braces, shall be at least 50 per cent of that required for the longitudinal joints of the same structure.

b. When 50 per cent or more of the load which would act on unstayed solid head of the same diameter as the shell, is, in consequence of the holding power of the tubes and stays, relieved by the effect of through tubes or stays, the strength of the circumferential joints in the shell shall be at least 35 per cent of that required for the longitudinal joints.

U-30. The riveted longitudinal joints of a shell or drum which exceeds 48 in. in diameter, shall be of butt-and-double-strap construction. This rule does not apply to the portion of a shell which is staybolted to the inner sheet.

U-31. The longitudinal joints of a shell or drum not more than 48 in. in diameter, may be of lap-riveted construction; but the maximum allowable working pressure of such construction shall not exceed 150 lb. per sq. in., nor 200 lb. per sq. in. for vessels less than 24 in. in diameter.

U-32. Butt straps and the ends of shell plates forming the longitudinal joints shall be rolled or formed to the proper curvature by pressure and not by blows.

U-33. The longitudinal joint of a dome 24 in. or over in inside diameter shall be of butt-and-double-strap construction or made without a seam of one piece of steel pressed into shape, and its flange shall be double-riveted to the shell. In the case of a dome less than 24 in. in diameter, for which the product of the inside diameter and the maximum allowable working pressure does not exceed 4000 in-lb., its flange may be single-riveted to the shell and the longitudinal joint may be of the lap type provided it is computed with a factor of safety not less than 8.

When shells are cut to apply domes or manholes the net area of metal, after rivet holes are deducted, in flange and liner, if used,

must not be less than the area required by these rules for a length of shell equal to the length removed. A height of vertical flange equal to three times the thickness of the flange shall be included in the area of the flange.

U-34. Rivet and Staybolt Holes. All holes in braces, lugs and sheets for rivets or staybolts shall be drilled full size with plates, butt straps, and heads bolted up in position, or they may be drilled or punched not to exceed $^1/_4$ in. less than full size for plates over $^5/_{16}$ in. in thickness and $^1/_8$ in. less than full size for plates not exceeding $^5/_{16}$ in. in thickness and then drilled or reamed to full size with plates, butt straps, and heads bolted up in position. The finished holes must be true, clean and concentric.

U-35. Rivets shall be of sufficient length to completely fill the rivet holes and form heads at least equal in strength to the bodies of the rivets. Forms of rivet heads that will be acceptable are shown in Fig. U-1.

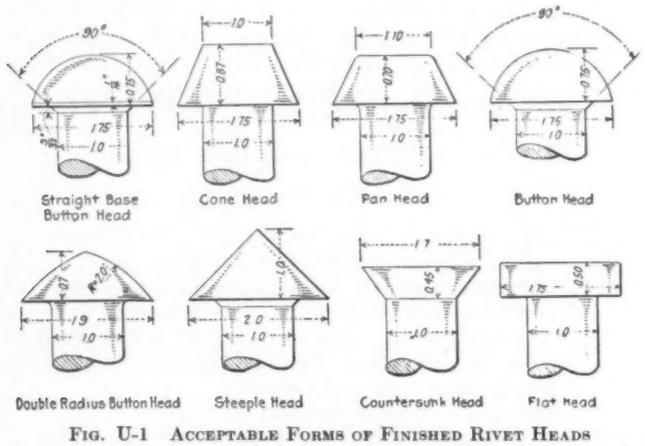


FIG. U-1 ACCEPTABLE FORMS OF FINISHED RIVET HEADS

DISHED HEADS

U-36. The thickness required in an unstayed dished head when it is a segment of a sphere shall be calculated as follows:

For $P \times L$ equal to or less than $^1/_2\ S$,

$$t = \frac{3PL}{4S}$$ for pressure on concave side

and

$$t = \frac{5PL}{4S}$$ for pressure on convex side

For $P \times L$ greater than $^1/_2\ S$,

$$t = \frac{PL}{2S} + {}^1/_8$$ for pressure on concave side

and

$$t = \frac{5PL}{6S} + 0.2$$ for pressure on convex side

where t = thickness of plate, in.
P = maximum allowable working pressure, lb. per sq. in.
L = radius to which the head is dished, in.
S = maximum allowable unit working stress of 11,000 lb. per sq. in. for steel plate stamped 55,000 lb. per sq. in., and 10,000 lb. per sq. in. for steel plate stamped less than 55,000 lb. per sq. in.

Where two radii are used, the longer shall be taken as the value of L in the formula.

Where the radius is less than 80 per cent of the diameter of the shell to which the head is attached, the thickness shall be at least that found by the formula by making L equal to 80 per cent of the diameter of the shell.

When a dished head has a manhole opening, the thickness, as determined by these Rules and formulas, shall be increased by not less than $^1/_8$ in.

U-37. When dished heads are of less thickness than determined by Par. U-36, they shall be stayed as flat surfaces, no allowance being made in such staying for the holding power due to the spherical form.

U-38. The corner radius of an unstayed dished head measured on the concave side of the head shall not be less than three times the plate thickness up to $t = 1$ in., and not less than $3t^2$ for thicker plates.

U-39. A manhole opening in a dished head shall be flanged to a depth measured from the outside of not less than three times the required thickness of the head.

BRACED AND STAYED SURFACES

U-40. The maximum allowable working pressure for various thicknesses of braced and stayed flat plates and those which by these Rules require staying as flat surfaces with braces or staybolts of uniform diameter symmetrically spaced, shall be calculated by the formula:

$$P = C \times \frac{T^2}{p^2} \times \frac{S}{11{,}000}$$

where P = maximum allowable working pressure, lb. per sq. in.
T = thickness of plate in sixteenths of an inch
S = maximum allowable unit working stress, lb. per sq. in.
p = maximum pitch measured between straight lines passing through the centers of the staybolts in the different rows, which lines may be horizontal, vertical or inclined, inches
C = 112 for stays screwed through plates not over $^7/_{16}$ in. thick with ends riveted over
= 120 for stays screwed through plates over $^7/_{16}$ in. thick with ends riveted over
= 135 for stays screwed through plates and fitted with single nuts outside of plate
= 150 for stays with heads not less than 1.3 times the diameter of the stays, screwed through plates or made taper fit and having the heads formed on the stays before installing them and not riveted over, said heads being made to have a true bearing on the plate
= 175 for stays fitted with inside and outside nuts and outside washers where the diameter of washers is not less than T.

If a flat plate not less than $^3/_8$ in. thick is strengthened with a securely riveted doubling plate covering the full area of the stayed surface and having a thickness of not less than $^2/_3\ T$, then the value of T in the formula shall be three-quarters of the combined thickness of the plate and doubling plate but not more than one and one-half times the thickness of the plate, and the value of C given above may also be increased 15 per cent.

When two sheets are connected by stays and but one of these sheets requires staying, the value of C is governed by the thickness of the sheet requiring staying.

Acceptable proportions for the ends of through stays with washers are indicated in Fig. U-2.

U-41. Staybolts. The ends of screwed staybolts shall be riveted over or upset by an equivalent process.

U-42. Structural Reinforcements. When channel or angle sections or other members are securely riveted to the heads for attaching through stays, the transverse stress on such members shall not exceed $1^1/_8$ times the maximum allowable unit working stress in pounds per square inch. In computing the stress, the section modulus of the member shall be used without addition for the strength of the plate. The spacing of the rivets over the supported surface shall be in conformity with that specified for staybolts.

If the outstanding legs of the two members are fastened together so that they act as one member in resisting the bending action produced by the load on the rivets attaching the members to the head of the pressure vessel, and provided that the spacing of these rivets attaching the members to the head is approximately uniform, the members may be computed as a single beam uniformly loaded and supported at the points where the through braces are attached.

U-43. a. The maximum spacing between centers of rivets attaching the crowfeet of braces to the braced surface, shall be determined as in Par. U-40, using 135 for the value of C.

b. The maximum spacing between the inner surface of the shell and lines parallel to the surface of the shell passing through the centers of the rivets attaching the crowfeet of braces to the head, shall be determined by the formula in Par. U-40, using 175 for the value of C.

c. The maximum distance between the inner surface of the shell and the centers of braces of other types shall be determined by the formula in Par. U-40, using a value of C equal to 1.3 times that value of C which applies to the thickness of plate and type of stay as therein specified.

d. In applying these Rules and those in Par. U-40 to a head or plate having a manhole or reinforced opening, the spacing applies only to the plate around the opening and not across the opening.

U-44. The formula in Par. U-40 was used in computing Table U-3 for steel plate stamped 55,000 lb. per sq. in. Where values for screwed stays with ends riveted over are required for conditions not given in Table U-3, they may be computed from the formula and used, provided the pitch does not exceed $8\frac{1}{2}$ in.

TABLE U-3 MAXIMUM ALLOWABLE PITCH, IN INCHES, OF SCREWED STAYBOLTS, ENDS RIVETED OVER

Pressure, lb. per sq. in.	Thickness of Plate, In. 5/16	3/8	7/16	1/2	9/16	5/8	11/16
	Maximum Pitch of Staybolts, In.						
100	5 1/4	6 3/8	7 3/8	...	...	...	...
110	5	6	7	8 3/8	...	...	...
120	4 3/4	5 3/4	6 3/4	8	...	...	...
125	4 3/4	5 5/8	6 5/8	7 3/4	...	...	...
130	4 5/8	5 1/2	6 1/2	7 5/8	...	...	...
140	4 1/2	5 3/8	6 1/4	7 3/8	8 3/8	...	...
150	4 1/4	5 1/8	6	7 1/8	8	...	...
160	4 1/8	5	5 7/8	6 7/8	7 3/4	...	...
170	4	4 7/8	5 5/8	6 3/4	7 1/2	8 3/8	...
180	...	4 3/4	5 1/2	6 1/2	7 3/8	8 1/8	...
190	...	4 5/8	6 3/8	6 3/8	7 1/8	7 7/8	...
200	...	4 1/2	5 1/4	6 1/8	7	7 7/8	8 1/2
225	...	4 1/4	4 7/8	5 7/8	6 1/2	7 1/4	8
250	...	4	4 5/8	5 1/2	6 1/4	6 7/8	7 5/8
300	...	...	4 1/4	5	5 5/8	6 1/4	7

U-45. The distance from the edge of a staybolt hole to a straight line tangent to the edges of the rivet holes may be substituted for p for staybolts adjacent to the riveted edges bounding a stayed surface. When the edge of stayed plate is flanged, p shall be measured from the inner surface to the flange, at about the line of rivets to the edge of the staybolts or to the projected edge of the staybolts.

U-46. The minimum diameter of a screw stay (usually the root of the thread) shall be used.

U-47. The least cross-sectional area of a stay shall be taken in calculating the allowable stress, except that when the stays are welded and have a larger cross-sectional area at the weld than at some other point, in which case the strength at the weld shall be computed as well as in the solid part and the lower value used.

U-48. Holes for screw stays shall be drilled full size or punched not to exceed 1/4 in. less than full diameter of the hole for plates over 5/16 in. in thickness, and 1/8 in. less than the full diameter of the hole for plates not exceeding 5/16 in. in thickness, and then drilled or reamed to the full diameter. The holes shall be tapped fair and true, with a full thread.

U-49. The end of steel stays upset for threading, shall be thoroughly annealed.

U-50. a. The full-pitch dimensions of the stays shall be employed in determining the area to be supported by a stay, and the area occupied by the stay shall be deducted therefrom to obtain the net area. The product of the net area in square inches by the maximum allowable working pressure in pounds per square inch gives the load to be supported by the stay.

b. The maximum allowable stress per square inch at point of least net cross-sectional area of steel or iron stays and staybolts shall be as given in Table U-4. In determining the net cross-sectional area of drilled or hollow staybolts, the cross-sectional area of the hole shall be deducted.

TABLE U-4 MAXIMUM ALLOWABLE STRESSES FOR STAYBOLTS OR BRACES

	Description of Stays	Stresses, Lb. per Sq. In. For lengths between supports not exceeding 120 diameters	For lengths between supports exceeding 120 diameters
a	Unwelded or flexible stays less than 20 diameters long, screwed through plates with ends riveted over	7,500	....
b	Hollow steel stays less than 20 diameters long, screwed through plates with ends riveted over	8,000	....
c	Unwelded stays or braces and unwelded portions of welded stays or braces, except as specified in line *a* and line *b*	9,500	8,500
d	Steel through stays or braces exceeding 1 1/2 in. diameter	10,400	9,000
e	Welded portions of stays or braces	6,000	6,000

U-51. Where it is impossible to calculate with a reasonable degree of accuracy the strength of a pressure vessel or any part thereof, a full-sized sample shall be built by the manufacturer and tested to destruction in the presence of the Boiler Code Committee or one or more representatives of the Boiler Code Committee appointed to witness such test.

CALKING

U-52. Calking. The calking edges of plates, butt straps, and heads shall be beveled to an angle not sharper than 70 deg. to the plane of the plate, and as near thereto as practicable. Every portion of the unfinished surfaces of the calking edges of plates, butt straps, and heads shall be planed, milled, or chipped to a depth of not less than 1/8 in. Calking shall be done with a tool of such form that there is no danger of scoring or damaging the plate underneath the calking edge, or splitting the calked sheet.

MANHOLES AND HANDHOLES

U-53. All vessels for use with compressed air, 16 in. in diameter, or over, and not exceeding 36 in. in diameter, shall have a handhole in the shell, or head, or have a manhole.

All such vessels less than 16 in. in diameter may be constructed without a handhole, provided there are at least two pipe connections, or provided they have bolted blank flanged heads.

U-54. All vessels for use with compressed air over 36 in. in diameter, excepting those whose shape or use make it impracticable, shall have a manhole. An elliptical manhole opening shall be not less than 11 by 15 in., or 10 by 16 in., in size. A circular manhole opening shall be not less than 15 in. in diameter.

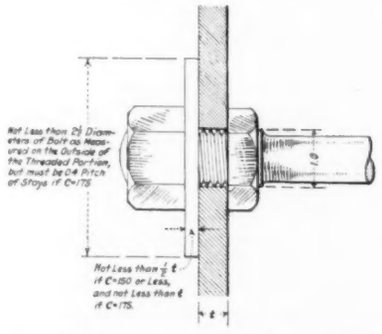


FIG. U-2 ACCEPTABLE PROPORTIONS FOR ENDS OF THROUGH STAYS

U-55. A manhole reinforcing ring, when used, shall be of rolled, forged or cast steel, shall be at least as thick as the shell plate, and shall have a net cross-sectional area, on a line parallel to the axis of the shell, not less than the cross-sectional area of shell plate removed on the same line.

U-56. Manhole frames on shells shall have the proper curvature and, when the diameter exceeds 48 in., shall be riveted to the shell with two rows of rivets.

U-57. The strength of the rivets in shear on each side of a manhole frame or reinforcing ring shall be at least equal to the tensile strength of the maximum amount of the shell plate removed by the opening and rivet holes for the reinforcement on any line parallel to the longitudinal axis of the shell, through the manhole or other opening.

U-58. Manhole plates shall be of rolled, forged, or cast steel, and their strength shall, together with that of the bolts and yokes, be in proportion to the strength of the manhole frames.

THREADED OPENINGS

U-59. A pipe connection 1 in. in diameter or over shall have not less than the number of threads given in Table U-5. Diameters of less than 1 in. pipe size shall have at least four threads.

If the thickness of the material in the pressure vessel is not sufficient to give such number of threads, the opening shall be reinforced by a pressed steel, cast steel, or bronze composition flange or plate, riveted or brazed on, or a boss may be built up by an autogenous welding process for an opening not to exceed 2 in. pipe size, and for a pressure not to exceed 100 lb. per sq. in., so as to provide the required number of threads.

When the maximum allowable working pressure exceeds 125 lb. per sq. in., a connection attached to the pressure vessel to receive

a flanged fitting shall be used for all pipe openings over 3 in. pipe size.

Supports

U-60. Supports. All vessels must be so supported as to properly distribute the stresses due to the weight of the vessel and contents.

Lugs or brackets when used to support a vessel shall be properly fitted to the surfaces to which they are attached. The shearing and crushing stresses on material used for attaching the lugs or brackets shall not exceed 40 per cent of the maximum allowable working stresses given in Pars. U-15 and U-16.

TABLE U-5 MINIMUM NUMBER OF PIPE THREADS FOR CONNECTIONS

Size of pipe connection in	1 and 1¼	1½ and 2	2½ to 4 inclusive	4½ to 6 inclusive	7 and 8	9 and 10	12
Number of threads per inch	11½	11½	8	8	8	8	8
Minimum number of threads required in opening	4	5	7	8	10	12	13
Minimum thickness of material required to give above number of threads, in	0.0348	0.435	0.875	1	1.25	1.5	1.625

U-61. In laying out the plates care must be taken to leave one of the stamps required in the Specifications for material used, so located as to be plainly visible when the vessel is completed; or in case these are unavoidably cut out, the heat number, quality of plate, minimum tensile strength and maker's name shall be accurately transferred as to form by the pressure-vessel manufacturer, to a location where these stamps will be visible. The form of stamping shall be such that it can be readily distinguished from the plate maker's stamping.

U-62. Vessels over 12 in. in diameter must be so arranged that the interior and exterior of the vessel may be inspected. In the case of vertical cylindrical vessels subject to corrosion, the bottom head, if dished, must be with the pressure on the concave side to insure complete drainage.

U-63. Every pressure vessel shall conform in all details with these rules, and when so constructed shall be stamped with the legend provided for in Par. U-66.

U-64. Hydrostatic Test. Each vessel constructed under these rules shall be tested under hydrostatic pressure to 50 lb. in excess of the maximum allowable working pressure when same does not exceed 100 lb., and to 1½ times the maximum allowable working pressures above 100 lb., except that vessels with fusion-welded joints shall be tested to three times the working pressure, and enameled vessels shall not be tested in excess of the working pressure.

U-65. Every pressure vessel shall be inspected at least once by a state or municipal inspector of boilers, or an inspector employed regularly by an insurance company which is authorized to do a boiler-insurance business in the state in which the vessel is built, and in the state in which it is to be used, if known, which inspection shall be made when the hydrostatic pressure test is on. A data sheet shall be filled out and signed by the manufacturer and the inspector, which data sheet together with the stamping on the vessel, will denote that it is constructed in accordance with these rules. Every pressure vessel fabricated in whole or in part by a welding process, shall, when the size of the shell permits, be internally inspected before being finally closed to inspection.

U-66. Each such pressure vessel shall be marked in the presence of the inspector, A.S.M.E. Std. P.V., the class, and with the manufacturer's name and serial number and working pressure. These markings shall be stamped with letters and figures at least 5/16 in. high on some conspicuous portion of the vessel, preferably near a manhole, if any, or handhole. These stamps shall be arranged substantially as follows:

A.S.M.E. Std. P.V.
Serial No.....
Max. W.P.....lb.
Mfrs. No.....
.....
(Mfrs. Name)

and shall not be covered with insulating or other material. The symbol authorized for use on power boilers shall not be used on pressure vessels.

Rules for the Fusion Process of Welding

U-67. Processes. The fusion process, so-called, shall consist of welding by means of either the oxy-acetylene process or the electric-arc process, using a metallic electrode, either bare, coated, or covered.

U-68. When properly welded by the fusion process, the strength of a joint may be calculated on a maximum unit working stress (*S*) of 5600 lb. per sq. in. (See Par. U-20.)

U-69. The term "base metal" shall mean the metal or metals of which the vessel is constructed and which are joined together by the welded seam.

U-70. Material for Base Metal. The base metal shall not exceed 5/8 in. thickness, shall be of good weldable quality, and when of steel shall be made by the open-hearth process, conforming to the requirements of the Specifications for Forge Welding, Pars. U-110 to U-125.

Construction

U-71. Method of Welding. Longitudinal seams shall be of the double-V type, that is, welded from each side halfway through the sheet. Girth and head seams may be of the single-V type, that is, welded entirely through from the outside. Double-V welds shall be reinforced at the center of the weld on each side of the plate by at least 25 per cent of the plate thickness. Single-V welds shall extend entirely through the plate and shall be reinforced at the center of the weld by not over 20 per cent of plate thickness. All welds shall be of sound metal, thoroughly fused to the sides of the V its entire depth. Sheets must not be allowed to lap during welding. In material ¼ in. or less in thickness, the longitudinal seams need not be beveled. In material less than ¼ in. thick, beveling the heads will be sufficient, and the shell need not be beveled at the head seams. One side of each girth seam shall be beveled.

There shall be no valley either at the edge or in the center of the joint, and the weld shall be so built up that the welded metal will present a gradual increase in thickness from the surface of the sheet to the center of the weld.

At no point shall the sheet on one side of the joint be offset with the sheet on the other side of the joint in excess of one-quarter of the minimum thickness of the sheets, or plates.

U-72. Longitudinal Joints. Where vessels are made up of two or more courses with welded longitudinal joints, the joints of adjacent courses shall be not less than 60 deg. apart.

U-73. Distortion. The cylinder or barrel of a vessel shall be substantially circular at any section, and to meet this requirement shall be reheated, rerolled or reformed.

U-74. Dished Heads. Dished heads convex to the pressure shall have a flange not less than 1½ in. long and shall be inserted into the shell with a driving fit in excess of the full length of the flange welded to the shell with a V'ed weld, heated to the annealing point, the shell to be constricted on the end to a diameter not less than 1 in. smaller than the original diameter.

Dished heads concave to the pressure shall have a length of flange not less than 12 per cent of the diameter for shells 24 in. in diameter or less, but in no case less than 1 in. For vessels over 24 in. diameter this length shall be not less than 1½ in.

U-75. Hemispherical Heads. Hemispherical heads concave to the pressure shall have a flange not less than 1 in. long, and shall be attached to the cylinder by a butt weld.

U-76. Nozzles in heads or shells not to exceed 12 in. nominal diameter shall be of forged or rolled steel, and shall be formed and welded in accordance with Fig. U-3*a*. The nominal diameter of the nozzle shall not exceed one half the nominal diameter of the shell.

U-77. Threaded connections shall be made as shown in Fig. U-3*b* to U-3*j*. In all cases threaded connections shall be not less than extra-heavy pipe size, and shall be set into the shell plate with sufficient clearance to allow of thorough fusing completely through the shell plate, V'ing out the shell plate for this purpose, if necessary.

U-78. Hydrostatic and Hammer Tests. While subject to the hydrostatic pressure herein before specified, a thorough hammer or impact test shall be given. This impact test shall consist of strik-

ing the sheet on both sides of the welded seam a sharp vibratory blow with a 2- to 6-lb. hammer with a handle similar to a blacksmith's striking hammer, the blows to be struck 2 to 3 in. apart and within 2 to 3 in. of, and on each side of, the seam—the blows to be as rapid as a man can conveniently strike a sharp, swinging blow, and as hard as can be struck without indenting or distorting the metal of the sheet. During this test the shell shall be completely filled with water.

U-79. Defective Welds. Welded seams, or joints, which do not pass this test without leaks, distortion, or other signs of distress, shall be corrected and a further test applied which shall be successfully passed before the vessel is accepted. Defective sections of a welded seam may be cut out and rewelded provided the value of the sheet has not been definitely lowered.

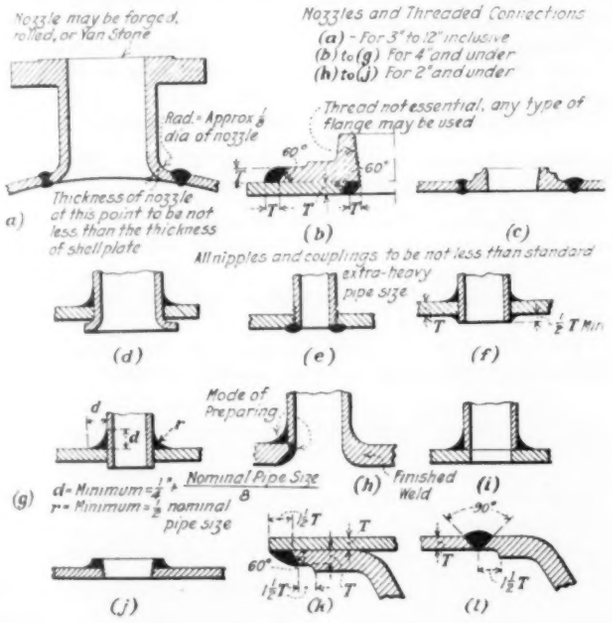


FIG. U-3 METHODS OF AUTOGENOUS WELDING NOZZLES

RULES FOR FORGE WELDING

U-80. The plate for any part of a forge-welded vessel, on which welding is done, shall be of forge-welding quality in accordance with the Specifications for Forge Welding, Pars. U-110 to U-125.

Construction

U-81. The minimum thickness of any shell plate shall be ¼ in., but the thickness of shell plate shall be not less than the inside diameter of the vessel divided by 200.

U-82. When properly welded by the forging process the strength of a joint may be calculated on maximum unit working stress $S = 7650$ lb. per sq. in. (See Par. U-20.)

U-83. Corner Radius of Dished Heads. The corner radius of a dished head measured on the concave side of the head, shall be not less than 6 per cent of the inside diameter of the head (see *A*, Fig. U-4*a*).

U-84. Depth of Flange. The depth of flange on the flanged and dished head measured from a point tangent to the corner radius of the head to the end of the flange, shall be not less than 5 in.

U-85. Heating. The heating agent shall be suitably prepared water gas or other heating medium by which equivalent or superior results will be obtained, and shall be applied to both sides of the section and adjacent surfaces, and precaution shall be taken to see that the flame is of a character that will minimize the possibility of burning or oxidizing the metal and that it be free from all impurities which would tend to introduce foreign elements into the steel. The temperature of the flame for heating the surfaces shall be under constant and close control.

U-86. Welding. The edges that are to be welded together shall be lapped a distance at least equal to the thickness of the plate to be welded. All plates ⅞ in. thick and under shall be welded without scarfing; plates more than ⅞ in. thick, if desired by the manufacturer, may be scarfed, the scarf to start at least one-half the thickness of the plate from the side next to the weld (see *A*, Fig. U-4*d*). When the material has been brought to the proper welding temperature, it shall be placed between an anvil and a hammer, or between rolls, or mandrel and roll, or between mandrels, and the plates welded together by a pressure applied by the hammer, rolls, or mandrels, which will actually displace the material while the welding action is occurring. The metal in and adjacent to the weld shall not be worked at what is termed the critical blue-heat temperature of the steel, that is, between about 400 and 800 deg. fahr.

The thickness of the weld for all longitudinal and circumferential seams or special welds (see Fig. U-4*d*) shall be as follows:

Minimum = t
Maximum = t plus 15 per cent

The contact line of completed forge weld shall be equal to at least two and one-half times the thickness of the plate (t) as shown at (*d*), Fig. U-4.

U-87. Annealing. After welding, the whole vessel or cylinder shall be heated to a temperature sufficient to remove the internal strains and then allowed to cool slowly in the air. Where this is impracticable on account of size or shape of vessel, all longitudinal and transverse welds shall be heated to the proper temperature for not less than 8 in. on each side of weld and allowed to cool slowly in the air. If any vessel has been distorted or deformed, it must be reformed and then annealed or reformed at a proper annealing temperature. In a finished cylindrical shell the variation in diameters shall not exceed 1 per cent of the mean outside diameter when measured at any section. When a straight edge two diameters long is laid longitudinally on the outside of a shell, it shall be possible to so set the straight edge that no part of the edge will come farther than 1 per cent of the mean outside diameter from the outer surfaces of the shell.

U-88. Inlet and Outlet Connections. All connections less than 5 in. standard pipe size may be attached by fusion welding as specified in the code for fusion welding (Pars. U-76 and U-77). Nozzles 5 in. and over shall be attached by forge welding or by riveting.

Nozzles which are attached by forge welding shall be of forged or rolled steel material, seamless tubing or forge-welded pipe, using either of the two methods shown at (*b*), Fig. U-4 or attached to a head by forge welding as shown at (*a*), Fig. U-4. Either the nozzle or shell may be flared for this purpose.

U-89. Saddle flanges may be used if made of forged steel and may be attached by forge welding by either of the two methods at (*c*), Fig. U-4, or by riveting.

U-90. All dished heads may be attached to shell by forge welding

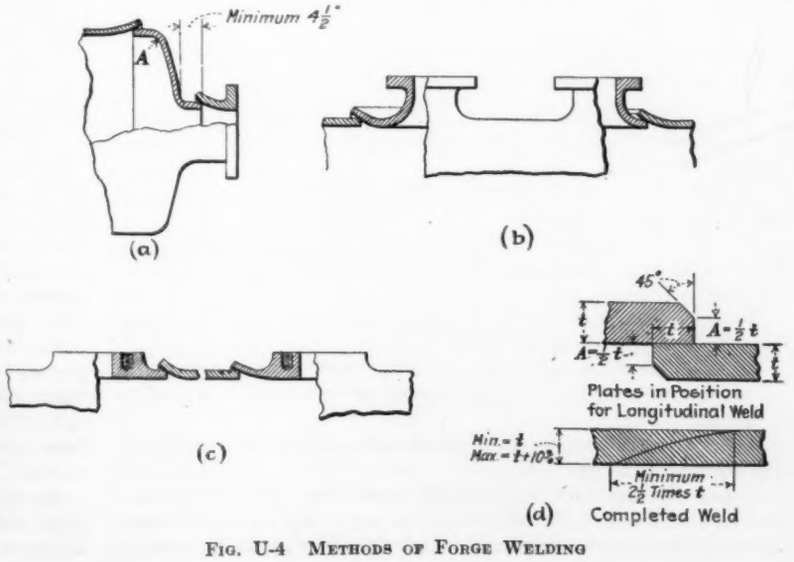


FIG. U-4 METHODS OF FORGE WELDING

as shown at (*a*), Fig. U-4, or by riveting. (Note corner radius *A* referred to in Par. U-83.)

RULES FOR BRAZING

U-91. Material. Steel plates for the shells of brazed vessels shall be made by the open-hearth process and shall not exceed $^3/_8$ in. in thickness. Plates $^1/_4$ in. thick or heavier shall be of either flange or firebox quality as provided for in the Specifications for Steel Boiler Plate. Sheets lighter than $^1/_4$ in. shall have the properties as provided in Pars. U-126 to U-131.

U-92. When the safety of the structure does not depend upon riveting in the joints, rivet holes may be punched full size.

U-93. For threaded openings, if the thickness of material in the pressure vessel is not sufficient to give the number of threads specified in Par. U-59, the openings may be reinforced by a plate brazed to the shell, by a forged boss with inside flange welded or brazed to the shell or head, or any of the methods shown in Fig. U-3 may be used.

U-94. When properly brazed the strength of a joint may be calculated on a maximum unit working stress S = 8550 lb. per sq. in. (see Par. U-20).

U-95. Longitudinal seams shall have the edges of the plate lapped a distance of not less than eight times the thickness of the metal. The lap shall be held closely in position substantially metal to metal, by stitch riveting or other sufficient means. The brazing shall be done by placing the flux and brazing material on one side of the joint and applying heat until this material comes entirely through the lap and shows uniformly along the seam on the other side. Sufficient flux must be used to cause the brazing material to so appear promptly after reaching the brazing temperature. The brazing material used shall be such as to give a joint which has a shearing strength of at least 10,000 lb. per sq. in.

U-96. Head Seams. Heads shall be driven into the shells with a tight driving fit, and shall be thoroughly brazed in approximately the same manner as the longitudinal seam for a depth or distance from the end of the shell equal to at least four times the thickness of the shell metal.

ENAMELED VESSELS

U-97. Material. All pressure vessels intended to be coated with glass or other enamel shall be made of steel or iron not under $^3/_{16}$ in. nor more than $^5/_8$ in. in thickness and may be welded by the oxy-acetylene, electric, or forge-welding processes. If forge welding is used the requirements of Pars. U-80 to U-90 shall be followed. All plates shall conform to the Specifications for Steel for Forge Welding, Pars. U-110 to U-125, and any plate not conforming thereto may be rejected.

U-98. The maximum allowable working pressure for single-shell vessels shall be determined by the following formula:

$$P = \frac{5000}{R}\,t$$

where t = thickness of plate, in.
R = inside radius, in.

U-99. The formula given in U-36 shall be used in calculating the minimum thickness of heads necessary for the various pressures and diameters.

U-100. The ratio of diameter of the vessel to thickness of plate shall in no case exceed 320.

U-101. Any brand of welding wire which has been found by practice to give good results may be used, and may be bare, coated or covered.

U-102. Vessels of this class will be considered under two types, viz., single-shell vessels and jacketed vessels.

U-103. Longitudinal seams of single-shell vessels welded by either the oxy-acetylene or electric processes or both shall be double-V welded.

The weld on all surfaces to be enameled may be ground flush with the surface of the plate.

U-104. Jacketed or double-shell vessels may be of two types, one in which one of the heads of the inner vessel forms the sealer apron for the jacket, and one in which the sealer apron is joined to the shell of the inner vessel at some point between the heads, forming a partially jacketed vessel.

U-105. The inner shell of a jacketed vessel shall be of the same construction as a single-shell vessel.

The thickness of the inner shell shall be at least 1.65 times the required thickness of the outside shell.

U-106. The longitudinal seam of the jacket shall be double-V welded. The circumferential seam in the jacket joining the head to the shell may be single-V welded.

U-107. In jacketed vessels where the sealer apron is welded to the shell of the inner vessel, and also where sealer apron is welded to the shell of the jacket, the weld may be made from outside only, provided the thickness of the metal deposited is equal to or greater than the thickness of the apron or plate.

U-108. In jacketed vessels where the top head of the inner shell forms the sealer apron, the head may be welded to the shell of the inner vessel from the inside only, provided the thickness of the weld after grinding is equal to or greater than the thickness of the shell.

U-109. All cylinders shall be rerolled after welding.

SPECIFICATIONS FOR STEEL PLATES OF FLANGE QUALITY FOR FORGE WELDING

U-110. Material Covered. These specifications cover steel plates of flange quality suitable for forge welding without the addition of fluxes.

U-111. Process. The steel shall be made by the open-hearth process.

U-112. Chemical Composition. a. The steel shall conform to the following requirements as to chemical composition:

Carbon	for plates $^3/_4$ in. or under in thickness	not over 0.15 per cent
	for plates over $^3/_4$ in. in thickness	not over 0.17 per cent
Manganese		0.35 to 0.60 per cent
Phosphorus	Acid	not over 0.06 per cent
	Basic	not over 0.04 per cent
Sulphur		not over 0.05 per cent

b. The composition of the steel should preferably be free from silicon, nickel, or chromium. Where these elements are present the maximum quantity of any one shall not exceed 0.05 per cent.

U-113. Ladle Analyses. An analysis of each melt of steel shall be made by the manufacturer to determine the percentages of carbon, manganese, phosphorus, and sulphur. This analysis shall be made from a test ingot taken during the pouring of the melt. The chemical composition thus determined shall be reported to the purchaser or his representative, and shall conform to the requirements specified.

U-114. Check Analyses. An analysis may be made by the purchaser from a broken tension-test specimen representing each plate as rolled. The chemical composition thus determined shall conform to the requirements specified.

U-115. Tension Tests. a. The material shall conform to the following minimum requirements as to tensile properties:

Tensile strength (T. S.), lb. per sq. in.	45,000
Yield point, lb. per sq. in.	0.5 T. S.
but in no case less than	24,000 lb. per sq. in.
Elongation in 8 in., per cent	30

b. The yield point shall be determined by the drop of the beam of the testing machine.

U-116. Modifications in Elongation. a. For material over $^3/_4$ in. in thickness a deduction from the percentages of elongation specified in Par. U-115 (*a*) of 0.125 per cent shall be made for each increase of $^1/_{32}$ in. of the specified thickness above $^3/_4$ in.

b. For material under $^5/_{16}$ in. in thickness, a deduction from the percentage of elongation in 8 in. specified in Par. U-115 (*A*) of 1.25 per cent shall be made for each decrease of $^1/_{32}$ in. of the specified thickness below $^5/_{16}$ in.

U-117. Bend Tests. The test specimen shall withstand being bent cold through 180 deg. without cracking on the outside bent portion, as follows: For material 1 in. or under in thickness, around a pin the diameter of which is equal to the thickness of the specimen; and for material over 1 in. in thickness, around a pin the diameter of which is equal to twice the thickness of the specimen.

U-118. Test Specimens. a. Tension-test specimens shall be taken longitudinally from the bottom of the finished rolled material, and bend-test specimens shall be taken transversely from the middle of the top of the finished rolled material. The longitudinal-test specimens shall be taken in the direction of the longitudinal axis of the ingot, and the transverse-test specimens at right angles to that axis.

b. Tension- and bend-test specimens shall be of the full thickness of material as rolled, and shall be machined to the form and dimensions shown in Fig. U-5; except that bend-test specimens may be machined with both edges parallel.

c. Test specimens for plates over $1^1/_2$ in. in thickness may be machined to a thickness or diameter of at least $^3/_4$ in. for a length of at least 9 in.

d. The machined sides of rectangular bend-test specimens may have the corners rounded to a radius not over $^1/_{16}$ in.

U-119. Number of Tests. a. One tension and one bend test shall be made from each plate as rolled.

b. If any test specimen shows defective machining or develops flaws, it may be discarded and another specimen substituted.

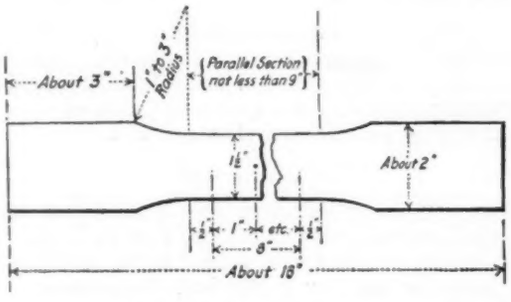


FIG. U-5 STANDARD FORM OF TEST SPECIMEN REQUIRED FOR ALL TENSION TESTS OF STEEL PLATE OF FLANGE QUALITY FOR FOLGE WELDING

c. If the percentage of elongation of any tension-test specimen is less than that specified in Par. U-115 (*a*) and any part of the fracture is outside the middle third of the gage length, as indicated by scribe scratches marked on the specimen before testing, a retest shall be allowed.

U-120. Permissible Variations. The thickness of each plate shall not vary more than 0.01 in. under that ordered.

U-121. Finish. The finished material shall be free from injurious defects and shall have a workmanlike finish.

U-122. Marking. a. The name or brand of the manufacturer, melt or slab number, class, and lowest tensile strength for its class specified in Par. U-115 (*a*) shall be legibly stamped on each plate. The melt or slab number shall be legibly stamped on each test specimen.

b. When specified on the order, plates shall be match-marked as defined in section (*c*) so that the test specimens representing them may be identified. When more than one plate is sheared from a single slab or ingot, each shall be match-marked so that they may all be identified with the test specimen representing them.

c. Each match mark shall consist of two overlapping circles each not less than $1^1/_2$ in. in diameter, placed upon the shear lines, and made by separate impressions of a single-circle steel die.

d. Match-marked coupons shall match with the sheets represented and only those which match properly shall be accepted.

U-123. Inspection. The inspector representing the purchaser shall have free entry, at all times while work on the contract of the purchaser is being performed, to all parts of the manufacturer's works which concern the manufacture of the material ordered. The manufacturer shall afford the inspector, without charge, all reasonable facilities to satisfy him that the material is being furnished in accordance with these specifications. All tests (except check analyses) and inspection shall be made at the place of manufacture prior to shipment, unless otherwise specified, and shall be so conducted as not to interfere unnecessarily with the operation of the works.

U-124. Rejection. a. Unless otherwise specified, any rejection based on tests made in accordance with Par. U-114 shall be reported within five working days from the receipt of samples.

b. Material which shows injurious defects subsequent to its acceptance at the manufacturer's works will be rejected, and the manufacturer shall be notified.

U-125. Rehearing. Samples tested in accordance with Par. U-114 which represent rejected material shall be preserved for two weeks from the date of the test report. In case of dissatisfaction with the results of the tests, the manufacturer may make claim for a rehearing within that time.

SPECIFICATIONS FOR STEEL PLATE FOR BRAZING

U-126. The steel shall conform to the following requirements as to chemical composition:

Carbon	not over 0.24 per cent
Manganese	not over 0.60 per cent
Phosphorus	not over 0.04 per cent
Sulphur	not over 0.05 per cent

U-127. Ladle analyses and check tests shall conform to the provisions of Pars. U-113 and U-114.

U-128. Tension Tests. The material shall conform to the following requirements as to tensile properties:

	Tensile Strength
Tensile strength, max. lb. per sq. in.	70,000
Yield point, min. lb. per sq. in.	28,000
Elongation, min. per cent	1,500,000

The elongation shall be measured on gage length of 24 times the thickness of specimen, except that this may be reduced by $2^1/_2$ per cent for each $^1/_{16}$ in. under $^5/_{16}$ in.

U-129. Bend Test. The bend-test specimen shall bend cold through 180 deg. without cracking on the outside of the bent portion, around a pin the diameter of which is equal to the thickness of the specimen.

U-130. Number of Tests. Two tension tests and two bend tests shall be taken from each heat, but not both tension or both bend tests from the same slab.

U-131. Sheets less than $^1/_4$ in. in thickness shall not be required to be stamped at the mill on account of the small size and light weight of the sheets. The manufacturer must mark each vessel in some permanent manner which will enable him to identify the heat from which the sheet in each tank has been rolled.

A.S.M.E. Boiler Code Committee Work

THE Boiler Code Committee meets monthly for the purpose of considering communications relative to the Boiler Code. Any one desiring information as to the application of the Code is requested to communicate with the Secretary of the Committee, Mr. C. W. Obert, 29 West 39th St., New York, N. Y.

The procedure of the Committee in handling the cases is as follows: All inquiries must be in written form before they are accepted for consideration. Copies are sent by the Secretary of the Committee to all of the members of the Committee. The interpretation, in the form of a reply, is then prepared by the Committee and passed upon at a regular meeting of the Committee. This interpretation is later submitted to the Council of the Society, for approval, after which it is issued to the inquirer and simultaneously published in MECHANICAL ENGINEERING.

Below are given interpretations of the Committee in Cases Nos. 446 and 454–460, inclusive, as formulated at the meeting of September 15, 1924, all having been approved by the Council. In accordance with established practice, names of inquirers have been omitted.

CASE NO. 446

Inquiry: Is it permissible, under the requirements of the Low-Pressure Heating Boiler Section of the Code, to apply crown-bar reinforcement to an oval or arched furnace crown sheet by the use of crown bars welded along their lower edges to the upper surface of the crown sheet? If not, what form of crown-bar reinforcement

is permissible under the Heating Boiler Section of the Code, and under what rule may such construction be calculated?

Reply: It is the opinion of the Committee that the construction described will be acceptable for steam heating boilers at pressures not exceeding 15 lb. and for water boilers for any pressure not exceeding 160 lb. where the strength of the crown bars, as calculated in Par. P-230*a*, is shown to be sufficient, assuming in the formula that *p*, the pitch of supporting bolts, is equal to the distance between the crown bars from center, and *C* is equal to 12,000.

CASE NO. 454

Inquiry: *a* Must a water-relief valve be attached immediately to hot-water boilers; if so, would a nipple and coupling between the valve and the boiler be considered as immediately attached?

b Would a valve with a rubber diaphragm be acceptable?

c Would a valve with a rubberseat disk be acceptable?

d Would a valve with a waterway through a number of smaller openings in the aggregate which are equivalent to the required area be acceptable?

Reply: *a* A connection not exceeding 6 in. in length and having a minimum cross-section not less than the nominal area of the relief valve required, will be considered by the Committee as being connected "as closely as possible" as required in Pars. H-46 and H-99.

b and *c* It is the opinion of the Committee that while Par. H-44 states that the valve shall be of the diaphragm-operated type, the Committee undoubtedly felt that a diaphragm of rubber or composition that was liable to fail, due to deterioration or vulcanizing when subjected to highly heated water or steam, would not be used. That being the case, the Committee recommends that materials of this nature be not used, for the seat disk nor should they be used for the diaphragm in diaphragm-operated valves under such conditions, for example, where the steam or hot water passes under the diaphragm.

d It is the opinion of the Committee that a valve exceeding $^1/_2$ in. nominal diameter may have multiple ports if such ports are each not of less area than that of a $^1/_2$-in. valve.

CASE NO. 455

Inquiry: Is it to be understood from Par. P-216, which states that the part of a tube sheet which comes between the tubes and shell of a boiler need not be stayed if the maximum pitch does not exceed $1^1/_2$ times the maximum pitch of staybolts for the corresponding thickness and pressure given in Table P-6, that it can be interpreted to mean that $1^1/_2$ times the pitch as determined by the formula given in Par. P-199 may be used, which will allow a much greater spacing when using heavy heads?

Reply: It is the opinion of the Committee that it will not be permissible, under Par. P-216, to determine the maximum pitch from the formula in Par. P-199, but that instead reference must be made to the maximum allowable pitches in Table P-6 and Par. P-204.

CASE NO. 456

Inquiry: Is it necessary, under the requirements of Par. P-324, to so locate the supporting lugs of h.r.t. boilers when they are of pressed-steel construction and of a triangular form, that the adjacent corners are not over 2 in. apart, whereas due to the triangular form it would be impossible to locate the edges of the bearing surfaces 2 in. apart?

Reply: It is the opinion of the Committee that the requirements of Par. P-324 will be met if lugs of the form described are so located on the boiler shell that their adjacent corners are not over 2 in. apart.

CASE NO. 457

Inquiry: Will it not be permissible in the construction of dry-back Scotch-type boilers to locate the fusible plug at a lesser distance than 2 in. above the upper row of tubes where the distance between the uppermost line of tubes and the top of the steam space is 13 in. or less, as is provided for h.r.t. and economic-type boilers in Pars. A-21*a* and A-21*r*?

Reply: In applying Par. A-21*q*, it is the opinion of the Committee that where the size of the boiler is such that the distance between the top line of tubes and the top of the steam space is not over 13 in., the same provisions as given for h.r.t. boilers in Par. A-21*a* may be allowed.

CASE NO. 458

Inquiry: Inquiry is made as to whether, under the requirement of Par. P-277 of the Code, it is permissible to connect both the steam delivery pipes and the safety valve to the boiler through the customary four-way or "niggerhead" fitting as is used in oil-country practice?

Reply: It is the opinion of the Committee that under the requirements of Par. P-277, it will be necessary to attach the safety valve or valves to the boiler through an entirely independent connection from that used for the steam delivery connection.

CASE NO. 459

Inquiry: An interpretation is requested as to the requirements of the Boiler Code for longitudinal joints of Adamson-type furnaces, as the Code apparently specifies the types of longitudinal joints for use in plain furnaces only.

Reply: Attention is called to the fact that Pars. P-239 and P-240 apply to *all* types of unstayed furnaces, so that the provisions therein for the construction of longitudinal joints of such unstayed furnaces apply generally to the Adamson type as well as to all other types of unstayed furnaces, whether vertical or horizontal.

CASE NO. 460

Inquiry: *a* If safety valves in sizes 3 in. or less for boilers operating at a working pressure of more than 15 lb. and not more than 125 lb. are provided with flanged inlets, must these flanges be extra heavy, or can they be standard dimensions and standard drilling?

b If two safety valves in sizes 3 in. or less are mounted on a Y base, must the inlet flange of the Y base be extra heavy, or can it be standard dimension where the working pressure does not exceed 125 lb.?

Reply: *a* Under Par. P-286, if the safety valves are of 3 in. or less in size, standard dimensions and standard drilling may be used.

b The outlet flanges on a Y base for connection to safety valves 3 in. or less in size may be of standard dimensions and standard drilling, but if the base flange of the Y is over 3 in. in diameter it would be necessary to make it extra heavy as provided for in Par. P-286.

National Conference on Aeronautical Nomenclature

THE National Conference on Aeronautical Nomenclature, organized by the National Advisory Committee for Aeronautics, held the first of a series of meetings in Washington on October 29 in the office of the latter committee. The meeting was called by Dr. Joseph S. Ames, Chairman of the Conference, pursuant to a general demand for a revision of aeronautical nomenclature which was formally recognized at a recent meeting of the National Advisory Committee for Aeronautics. So many new and conflicting aeronautical terms have come into use that a general conference of representatives of the Army and Navy air services, engineering societies, and the aircraft industry had become necessary in order to standardize the new language of the air.

The Conference, at which President-elect Wm. F. Durand represented the A.S.M.E., was organized into four sub-committees dealing with airship terms, engine terms, airways, and aerodynamics.

One term which provoked much criticism at the session was the more or less general misuse in the newspapers of the word "dirigible" when referring to an airship. It was pointed out that the *Shenandoah* and the *ZR-3* are "dirigible" airships, dirigible being used only as an adjective to distinguish between airships whose flight is controllable and those that are at the mercy of the winds, such as balloons.

Correspondence

CONTRIBUTIONS to the Correspondence Department of "Mechanical Engineering" are solicited. Contributions particularly welcomed are discussions of papers published in this journal, brief articles of current interest to mechanical engineers, or comments from members of The American Society of Mechanical Engineers on articles or policies of the Society in Research and Standardization.

A Plea for Circular, Cylindrical, and Spherical Units of Measurement

TO THE EDITOR:

You have asked me to describe the application of the circular inch in the measurement of fluids in cylindrical vessels and pipes, and I am accordingly giving you the following outline for the consideration and criticism of the members and readers of MECHANICAL ENGINEERING. I shall be greatly pleased to go into further details if called upon by the interest of your readers.

I am suggesting to the engineering profession not only the adoption of a circular unit for measuring areas of round containers, but also a cylindrical unit for measuring the corresponding volumes of those containers and a spherical unit for measuring volumes or cubical contents of ball-shaped bodies.

For a number of years I have used the circular unit of area in calculations of flow measurement through various sizes of pipes and have found it very simple and advantageous in every respect. I have adopted the circular inch as a basis for the English system and the circular centimeter as a basis for the metric system. This unit is similar to the circular inch employed for the measurement of electrical wire conductors.

My tables for the various sizes of pipes contain the internal diameter in inches and the internal section in circular inches, which latter unit is simply the internal diameter squared. As I stated once in my discussion on orifice coefficients, it is rather unfortunate that this method is not adhered to by all the manufacturers of fluid meters, as it deprives the user of the advantage of visualizing the flow through the orifice as compared to the flow through the pipe.

When I think of a 5-in. orifice in a 10-in. pipe I see before me a jet of 25 circular inches as compared with an extension of 100 circular inches, and which is 25 per cent of the total area. I cannot imagine a jet as a diameter, but as a diameter squared. I will add now that I cannot imagine a jet issuing from a circular opening as a square at all, but as a circular area of the diameter squared.

After trying this method of figuring for a number of years and demonstrating its advantages, I came to the conclusion that the same method could easily be adopted by the engineering profession in general for the measurement of the cubical contents of cylinders by the corresponding cylindrical unit, and the cubical contents of spheres by the corresponding spherical unit. This would greatly simplify the calculations of the quantities involved; it would make the comparison of magnitudes more natural; and it would in no way interfere with the conversion to the present flat-area square and cubical system.

It can be readily seen that nature, in the very beginning, did not intend to measure circles, cylinders, and spheres by a flat unit; otherwise she would have provided a commensurable ratio between the circle and the four-cornered square. I am sure that the four-cornered square or eight-cornered cube was adopted as a unit as a result of the belief at that time that the earth was a four-cornered flat surface with the sky attached to the square sides which surrounded it. Since we have learned now that nature, of her own accord, creates mainly spherical and circular bodies, there is no reason why the units of measurement bringing to the mind the ratio of magnitudes of these bodies should not be of the same circular or spherical type.

I am sure the adoption of these units for the particular purposes will give immediate relief from tedious calculations at the very start. It is only proper that water supply should be measured in so many cylindrical feet of water, and that gas supply should be measured in so many cylindrical feet of gas. In either case the fundamental test of the measuring device is made by comparing it with a cylindrical container in the form of a holder or tank. It is well known that the transfer to the eight-cornered cubical unit involves tedious computations and certain inaccuracies inherent in the transfer.

Supplies of water or of gas are usually accumulated in cylindrical tanks and are conveyed therefrom in cylindrical pipes, and it is odd indeed that both the conveyors and the holders should be first transferred to inconvenient measures of imaginary squares and then compared with each other on that basis instead of carrying out the comparison at all times on the natural basis of cylindrical units.

The adoption of the spherical unit would offer still greater advantages in the measurement and comparison of spherical bodies. How expedient it would be to state that the spherical contents of the earth should be equal to 8×10^9 spherical miles, which would be the diameter cube of the earth in miles. It would give an immediate comparison with a sphere one mile in diameter, and if some one were interested in finding out what the cubical contents of the earth would be in units of the eight-cornered cubical system, he would simply have to multiply the number of spherical units by $\pi/6$, which cannot be given as an exact figure but which is very close to 0.5235987756. . . . . This would be the only time any one would have to worry about the use of the Greek letter π, which has no exact equivalent in our numerical system.

In conclusion, I wish to state that the introduction of the circular, cylindrical, and spherical units into our system of measurement would not involve any difficulties even at the very start. All it requires is a plain, ordinary definition of these units and their adoption for practical purposes. It is so easy to see that the area of a circular foot contains 12×12 or 144 circular inches; the volume of a cylindrical foot contains $12 \times 12 \times 12$ or 1728 cylindrical inches; and the volume of a spherical foot contains $12 \times 12 \times 12$ or 1728 spherical inches.

If this system should be adopted, all the numerous tables in the various handbooks giving the square and the cubical contents of circular and spherical bodies, would be replaced by one simple rule: namely,

> To change a quantity from circular or cylindrical to square units, multiply by $\pi/4$; and vice versa, to change a quantity from square to circular or cylindrical units, divide by $\pi/4$. To change a quantity from spherical to cubical units, multiply by $\pi/6$; and vice versa, to change a quantity from cubical to spherical units, divide by $\pi/6$.

With this provision, all quantities would be easily computed as squares and cubes of the given diameter and the Greek letter π would be very, very seldom used, if at all.

J. M. SPITZGLASS.[1]

Chicago, Ill.

Proposed Standards for Herringbone Gears

TO THE EDITOR:

The writer wishes to call attention to certain points relating to the properties of the steels in the Report on Proposed Standards for Herringbone Gears for General Commercial Use.[2]

In a letter from Frank A. Mickle and Charles W. Good, published in MECHANICAL ENGINEERING for October, 1924, a table is given for the properties of steels, which they state to have been compiled from the Proposed Standards, with additional information from S.A.E. specifications. The additional information relates to the yield points of three grades of steels drawn at two

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[2] Prepared by the Sectional Committee on the Standardization of Gears for which the American Gear Manufacturers Association and THE AMERICAN SOCIETY OF MECHANICAL ENGINEERS are joint sponsors. In an early form this report was printed in MECHANICAL ENGINEERING for February, 1923.

temperatures, respectively, and the factor of safety for materials drawn at 1300 deg. fahr. The yield points purport to be derived from S.A.E. specifications, but in most cases the figures cannot be checked, and appear to have been modified.

There is no chart of heat treatments and properties for S.A.E. steel 3245. There are, however, charts for S.A.E. steels 3240 and 3250. The figures given by Messrs. Mickle and Good correspond closely to those given in the chart for S.A.E. 3250 steel.

It is not clear why S.A.E. steel 1045 should be referred to as 50 C as the mean is 0.45 carbon. The next grade (S.A.E. 1030) is designated as 30 C steel and the mean is 0.30 carbon. In the case of steel 1045 the figures are the same as those shown in the S.A.E. chart.

In the case of S.A.E. steel 1030 there is no S.A.E. chart, but there are charts for 1025 and 1035. The properties shown by Messrs. Mickle and Good's letter, more nearly conform to the higher grade of steel than to the lower.

In the table below is given a comparison of the figures shown by Mickle and Good with certain figures which have been taken from S.A.E. charts.

S.A.E. Steel No.	Source of Information	Yield Point Drawn 1300 deg. fahr.	Yield Point Drawn 800 deg. fahr.
3245	Mickle and Good	98,000	200,000
3250	S.A.E. Chart	96,000	199,000
3240	S.A.E. Chart	86,000	180,000
3245	Mean of 3250 and 3240	91,000	189,500
1045	Mickle and Good	62,000	80,000
1045	S.A.E. Chart	62,000	80,000
1030	Mickle and Good	50,000	75,000
1035	S.A.E. Chart	51,000	66,000
1025	S.A.E. Chart	40,000	65,000
1030	Mean of 1035 and 1025	45,500	65,000

The writer realizes that in the case of S.A.E. 3245, taking the mean of the figures for 3240 and 3250 is not necessarily accurate, but since there is no S.A.E. chart for the grade of steel under consideration this is much more fair than to take the figures from some other grade, particularly when a grade so selected has higher properties. The same is true in regard to the figures for S.A.E. 1030.

If the figures given by Mickle and Good are based on actual tests of gears or other material made in the course of the investigation it would appear preferable to have it so stated and not refer to the S.A.E. charts, since the figures do not correspond. It is perhaps unnecessary to call attention to the fact that the S.A.E. charts are prepared with a view to showing the properties which could be expected of bars up to $1^1/_2$ in. diameter or square, and does not apply to larger sizes.

Naturally any change in the figures for the yield point would be reflected in those of either S or the factor of safety.

HUGH P. TIEMANN.

Pittsburgh, Pa.

The Mechanical Meaning of Hardness Numbers[1]

TO THE EDITOR:

It is very often said that values in which the property of hardness is measured on different hardness scales are arbitrary and not correlated among themselves.

It is true that only approximate correlation exists between hardness numbers obtained on different scales, and even that correlation is often applicable only to a limited range of hardness values. However, practically all well known methods of measuring hardness like impact, Brinell, Shore scleroscope, and Rockwell have a common mechanical meaning. This meaning is the resistance of the material to a permanent displacement of its particles, and the hardness numbers are measures of that resistance.

The impact method of measuring hardness was systematically investigated by Colonel Martel, who described it in the report of the "Commission des méthodes d'essai des matériaux de construction," 1895, 1re session, 3-4, p. 261. By Martel's method hardness is measured as resistance of a material to the permanent deformation produced by a falling weight provided with an indenting tool.

Martel's hardness number = Ph/v, where P = weight, h = height of fall, and v = volume of indentation. Thus Martel's hardness number is the specific work necessary to produce a unit-volume indentation. Martel was the first to give a scientific definition of the quantity represented by this hardness number, but essentially the same method has been in use for a long time in France, Austria, and Italy.

Professor Unwin (*Engineering*, vol. 105, p. 535, 1918), has shown that theoretically, at least, Martel's hardness number is identical with that of Brinell. The differences between the two might be explained by the losses accompanying the impact.

Professor Edwards (*Proc. Inst. Mech. Eng.*, 1918-I, p. 335), studied the correlation between the impact hardness number and a static Brinell hardness number. The results of this investigation have shown that there is a straight-line relation between the diameter of impact indentation (produced by a constant impact energy of 63 in-lb. and a Brinell diameter (3000-kg. load and 10-mm. ball).

It was found also that there is a definite relation between the Brinell hardness number (B.h.n.) and the diameter (d) of impact indentation, namely, B.h.n. = $7582/d^3$. Professor Edwards stated, however, that a rebound method (scleroscope) can only be expected to give a regular scale if the amount of energy is so adjusted that the same amount of penetration is obtained in all tests. The deformation itself is so small that the height of rebound is materially influenced by the nature of the surface and by the internal structure of metal. It is evident that in a scleroscope test the hardness number represents the energy of rebound and, as the impact energy is constant, the scleroscope number represents indirectly the amount of energy absorbed in indenting material.

In the case of Rockwell hardness number (R.h.n.) we have the following equation:

$$\text{R.h.n.} = C - \delta \quad \ldots\ldots [1]$$

where C is a constant and δ is the depth of indentation.

The indentation of the specimen is accompanied by the deformation of the frame of the machine and it may, generally, be assumed that this deformation is proportional to the load on the test piece. Therefore, the energy of producing an indentation is equal $P\delta/2$, where P is the load, and Equation [1] may be written thus:

$$\text{R.h.n.} = \frac{2}{P}\left(\frac{CP}{2} - \frac{P\delta}{2}\right) \quad \ldots\ldots [2]$$

Equation [2] gives R.h.n. as a function of the expression $\frac{CP}{2} - \frac{P\delta}{2}$

The first term of this expression is the energy which would be required to make an indentation on the softest material whose hardness can be measured on the Rockwell scale, that is, whose Rockwell hardness number is zero. In a way, it might be called the available energy of the Rockwell machine.

The second term, $P\delta/2$, is the energy which goes into making an indentation in a given material.

Thus, the Rockwell hardness number is proportional to a quantity which may be called the remaining energy of the machine. There is an analogy, therefore, between a Rockwell hardness number and a scleroscope number.

Thus, notwithstanding the multiplicity and seeming conventionality of hardness values, they all tend in one way or another to measure the energy which a material absorbs when it is indented. However, no definite relation, expressible by a conversion formula, can always be expected between the different hardness numbers. Generally speaking, different hardness numbers may be expected to be convertible one into the other only when the amount of displaced material and the depth of penetration are the same in each case.

The practical difficulties involved in fulfilling this requirement are so great that it is impracticable to overcome them in hardness testing in the shop or laboratory.

S. N. PETRENKO.[1]

Washington, D. C.

[1] Published by permission of the Director of the Bureau of Standards of the U. S. Department of Commerce.

[1] Associate Mechanical Engineer, Bureau of Standards.

Engineering and Industrial Standardization

Specifications for Steam Turbines

THROUGH the American Engineering Standards Committee and the Czechoslovakian national standardizing body, the A.S.M.E. has just received a Standard Specification for Steam Turbines (in English), covering in eight mimeographed pages the following points:

A. Figures Guaranteed by the Contract: Rating, steam consumption, speed regulation, safety of operation, and items supplied
B. Units
C. Testing: Object of the test, time and expense of the tests, gages and arrangement of the unit for the test, general requirements of tests, measuring of steam consumption, measuring pressure and temperature, and figuring results and report.

New Standards for Wire Rope

AN IMPORTANT set of draft standards for wire rope has been published for criticism by the Swiss in their journal, *Technik und Betrieb*. This topic is one which is now being studied in this country by a Sectional Committee, in connection with the standardization program of the American Mining Congress going forward under the American Engineering Standards Committee's auspices. It is not unlikely that later on this work will develop into a broad project for standardization of wire rope for all uses.

The Swiss draft standards include a general and theoretical discussion of wire ropes, including definitions, standards designations, and formulas for calculation; and designs of wire ropes for general use, and for elevators, cranes and pulley blocks. The standards include besides complete dimensional design of the ropes, working limits, and methods of calculation.

The only other important standards for wire ropes are those of the Belgians, published in November, 1922; of the Germans, published in October, 1923; of the Canadians published in 1921, and of the Transvaal Chamber of Mines, which date back to April, 1919.

Czechoslovakia Makes Progress in Standardization

"INDUSTRIAL-STANDARDIZATION work has attained a very high development in Czecholovakia, where the national standardizing body, although only about a year old, has already under way some two hundred standardization projects. It has fifty committees and sub-committees actively at work, including a membership of about seven hundred individuals, which is not far below the number engaged in this work under national auspices in the United States." This information is contained in an article appearing in a Bulletin which the American Engineering Standards Committee issued some little time ago. It proceeds:

"Interesting instances of the need for standardization are recounted by B. Rosenbaum, director of the Czechoslovakian national standardizing body, in a paper read before the First International Management Congress recently held in Prague. He reports forty different types of small rails varying from $1^5/_8$ to $3^1/_4$ inches in height. Likewise, during nine years a single firm manufacturing cars for mine railways and industrial trackage reports having filled orders for cars involving 76 different railway-track gages. The same firm has a thousand different patterns for wheels for such cars.

"It is expected that in the case of small rails, five or six types will likely replace the 40 now in use, and that five track gages, including the international gages for street and steam railways, will replace the 76 cited in this second example. Instead of a thousand different wheel patterns, it is expected that nine wheels of a heavy type and nine of a light type will cover all requirements. Following this simplification of designs and stocks it will be possible to make a successful beginning in the equally important problem of standardizing axles, bearings, and other associated parts."

Standardization of Pattern and Flask Equipment

SOME years ago several members of the American Foundrymen's Association conceived the possibility of standardization of certain foundry equipment as a means of greater savings in the cost of producing castings, particularly as applied to the making of molds and cores by the machine method. Molding machines had been developed and had been on the market for a number of years, and although their use had increased production and lowered the cost in many shops, still there seemed to be an opportunity to increase the savings very materially by serving these machines better. The result was the formation of a committee to investigate the standardization of pattern equipment. The committee also saw the desirability of uniform practice in certain phases of patternmaking.

This committee work progressed and the American Foundrymen's Association was soon able to interest other societies of the metal trades in its work. In due time a new joint committee was formed. Seven other national organizations lent their coöperation, and the work became one of great possibility with widespread support. The following national organizations appointed two representatives each: American Foundrymen's Association; American Institute of Mining and Metallurgical Engineers, American Malleable Castings Association, American Society for Testing Materials, Foundry Equipment Manufacturers Association, National Association of Pattern Manufacturers, National Association of Purchasing Agents, and Steel Founders Society.

In 1923 E. S. Carman, of The Osborn Manufacturing Company, of Cleveland, Ohio, was appointed general chairman. In the spring of 1924 plans were made to aid the general chairman materially in the preliminary work and a secretary for the joint committee was secured. Through the aid of this full-time assistant, a satisfactory start was made on the tentative plans.

The general chairman has divided the preliminary work into three parts. These consist of: (1) Patternmaking and marking; (2) Pattern plates and mounting; and (3) Flask sizes and details. In order to deal with the specific details of the work as classified above, three sub-committees have been formed with a chairman and four or five members each. As the preliminary details are completed they are sent to the respective sub-committees for criticism, suggestion, or approval. The preliminary work consists in preparing questionnaire sheets in the form of drawings and tabulations of the tentative proposed standards for each of the three subdivisions as outlined above. These are made up in as concise a form as possible in order that too much time will not be consumed in answering them. The sub-committee members, together with the original members of the joint committee who represent the eight national trade associations aforementioned, comprise what is termed the general committee or committee of the whole. The questionnaire sheets are first criticized by the general committee, including the comments and recommendations made before by sub-committee members. The approval of the general committee being granted, the questionnaire sheets would be revised and sent to a large number of foundries whose current practice is representative of the best. Spaces are provided in the questionnaire sheets for recommendations where the standards proposed by the joint committee are not approved. The information thus obtained would again be referred first to sub-committees and then to the general committee for further discussion. Thus, as a result of this procedure the standards decided upon would be recommended for adoption.[1]

[1] It is suggested that the full advantage of this important piece of work would be secured to industry by developing the joint committee into a Sectional Committee organized under the procedure of the American Engineering Standards Committee.

MECHANICAL ENGINEERING

A Monthly Journal Containing a Review of Progress and Attainments in Mechanical Engineering and Related Fields, The Engineering Index (of current engineering literature), together with a Summary of the Activities, Papers and Proceedings of

The American Society of Mechanical Engineers

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What the Last Decimal Can Tell

IT HAS BEEN found in many instances that materials which give a comparatively low Brinell test offer obstacles to cutting of a character encountered chiefly with hard materials, a fact which is puzzling to say the least. Recent work on Rockwell and Brinell hardness testing carried out at the Massachusetts Institute of Technology and reported in a paper before the American Society for Steel Treating by Prof. Irving H. Cowdrey, of the Massachusetts Institute of Technology, throws some light on this situation by showing that not only can adjoining spots of the same material be of widely varying hardness, but that different spots even within the confines of the same crystal are not always of the same or nearly the same hardness.

This was discovered simply by a greater precision in measurement, namely, by measuring hardness over comparatively small areas rather than employing a previous method of measurement which gave an integrated value over a larger area. This is one more indication of what might be called the revelation of the last decimal point. There have been numberless instances in science and engineering in which a greater precision in measurement or in calculation has either explained phenomena which were puzzling previously or revealed unsuspected conditions.

A brilliant illustration of this is offered by Lord Ramsay's classical investigation of the weight of nitrogen obtained from air by the removal of oxygen and other then known gases, and of nitrogen obtained from chemical compounds. Carried to a high state of precision these measurements revealed a hitherto unsuspected difference between the two weights, which ultimately led to the discovery of the valuable inert gases, argon, neon, xenon, and krypton. Similar high-precision measurements of weights of metals and metalloids obtained in different ways, carried out in particular on lead and chlorine, have helped to establish the theory of isotopes, i.e., the occurrence of chemical elements in more than one structural form, a discovery which is gradually helping to revolutionize our whole conception of the structure of elements and their interrelations.

With the increase in use of high pressure and high temperature, steam engineering is gradually approaching, and in some cases has already passed, the limit where steam may be considered as simply H_2O in the form of vapor, exclusively subject to the laws defining the relations of volume, pressure, and temperature for imperfect gases. We are entering a field where more complicated laws affecting the molecular composition of the vapor and the stability of its constitutional structure become active, and it is only the last decimal in the measurement of the properties of steam and its behavior under these temperature and pressure conditions that is likely to give true information.

Storage of Coal

THE Report of the Committee on Storage of Coal has been recently issued by the Ronald Press in book form under the title Industrial Coal: Purchase, Delivery and Storage. This Committee was appointed by the American Engineering Council to investigate the seasonal storage of coal and the effect of such storage in stabilizing the industry. Work started in May, 1923, and a summary of the final report appeared in MECHANICAL ENGINEERING and other technical papers during August, 1924. Over 400 engineers serving on 67 sub-committees throughout the country contributed to this survey, which is nationally representative.

The issue of the complete report in book form emphasizes again the recommendation of the Committee that all coal consumers purchase their coal on an annual contract for yearly requirements with the provision that the coal be delivered monthly in equal allotments, and further that each consumer provide necessary storage facilities to meet the terms of such a contract. The Committee points out that the monthly delivery basis will permit the mines and carriers to maintain regular schedules, that sufficient stocks of coal will automatically accumulate during the summer months to care for winter consumption, and that a reduction of price will be made possible by regularity of schedule and consequent elimination of peak demands in winter when production and transportation costs are highest.

The solution of the problem is apparently in the hands of the consumer. The editorial comments of the daily press indicate that in this respect the emphasis of the report is appreciated, but there is still much room for greater comprehension and action based on understanding if the urge of the Committee recommendation is to bring results in the coal industry.

The book contains a great deal of pertinent material to the problem of coal storage, and it will be reviewed at length in the January issue of MECHANICAL ENGINEERING.

A Hero of Peace

THE master builder of tunnels, Clifford M. Holland, is dead. His life was short, his achievements great. At the age of thirty-six he was chosen chief engineer of the greatest subaqueous tunnel project in the world. At the age of forty-one, on the eve of the final "holing through" of this project, Clifford M. Holland paid the price of intensive devotion to duty, night and day, for five years. His heart, overstrained while a member of the Harvard crew and weakened by work in compressed air—necessary on the job he had undertaken—failed him, and a hero of peace passed on.

Holland was a great engineer. He typified the highest ideals of his profession. It is said that the morning after his graduation from Harvard with a degree in civil engineering in 1906, he started to work at tunnels. They held a peculiar fascination for him and almost immediately he recognized in them his life work. Miles of tunnels were built in the city of New York under his personal supervision. At the age of thirty-two he engineered $25,000,000 worth of subway construction under the East River. Then came the opportunity for the New York-New Jersey Vehicular Tunnel, and Holland was chosen chief engineer for this project because he had the most comprehensive experience in subaqueous tunneling of any man around New York at the time, regardless of age.

He was a man of great power of concentration. In his devotion to his work he knew no office hours. It was his ambition to build tunnels and he achieved his ambition. His success proves that the engineering work of the world cannot be done in the eight-hour day. But this is tragedy—that a man should so brilliantly achieve and lose his life in doing so. It is heroism, too, for Holland followed his daily tasks knowing his span was limited. All branches of the engineering profession honor him as a master builder and a hero.

Towne Bequeaths Large Amounts

BY THE will of Henry R. Towne, Past-President of The American Society of Mechanical Engineers, the endowment of the Engineering Foundation is increased by $50,000. The new bequest establishes the Henry R. Towne Engineering Fund, the income from which is to be expended for the furtherance of research in science and engineering, or for the advancement in any other way of the profession of engineering and the good of mankind. Mr. Towne was for years a friend of Ambrose Swasey, the founder of Engineering Foundation, and like him a believer in the value of engineering research.

The bulk of Mr. Towne's estate, estimated at several millions, is given as a residuary bequest after the death of his son, John Henry Towne, to establish museums of peaceful arts, or industrial museums, for the people of the city of New York. He provided a fund of $50,000 for a campaign to bring to public notice essential facts regarding the great industrial museums of Europe. The will urges the support of this movement by members of the Merchants' Association, of which he was a former president, and other interested citizens. It further asks that a committee be selected to go to Europe to obtain data regarding such institutions there.

Provision is also made in Mr. Towne's will for a trust fund of $10,000 for the Franklin Institute at Philadelphia, which is established in memory of his father who was actively connected with the Institute.

Engineers Honor Ferranti

THE four national engineering societies tendered a luncheon at the Yale Club, New York City, on November 6 to Dr. S. Z. de Ferranti, eminent British engineer and a pioneer in the field of electrical distribution. Greetings from the four Societies were extended through Calvert Townley, representing the A.I.E.E., Alex Dow, representing the A.S.C.E., J. V. W. Reynders, representing the A.I.M.E., and President Fred R. Low, representing the A.S.M.E. John W. Lieb presided.

Dr. de Ferranti responded to the greetings with reminiscences of his early experiences in the electrical field. He said that when he first became engaged in electrical work he was of the opinion that there was little left to be accomplished, but after more than forty years of experience he feels that the opportunity in this field at present is even greater than it was when he entered it. In his talk Dr. de Ferranti told of some of his experiences in developing an electric-supply system for London in 1886. His work on this system led to his developing workable transformers and to the introduction of paper-covered cables. There were practically no measuring instruments at that time and the voltage on the high-tension system was measured by means of lamps in series, the brightness indicating the comparative increase or decrease in voltage. Another problem which was met in this work was the adaptation of existing types of engines to take care of a variable electrical load.

Personnel Research Federation

W. V. BINGHAM, of Carnegie Institute of Technology, has been appointed Director of Personnel Research Federation, which has its office in the Engineering Societies Building, 29 West 39th Street, New York City. The Federation was established in 1921, under the auspices of Engineering Foundation and National Research Council. It comprises more than twenty societies, research bureaus, and universities engaged in the scientific investigation of problems affecting workers and their work.

The activities of the Federation that interlock most closely with the interests of the engineering societies include, 1, the study of placement agencies and their efficient functioning in bringing men and jobs together; 2, the collection of information about opportunities and careers as an aid not only in placement but also in educational guidance, in high school, engineering school, and college; and 3, the investigation of effective methods and practices of industrial personnel administration.

The official publication of the Federation is the *Journal of Personnel Research*, which has recently contained contributions by engineers on such topics as engineering aptitudes, motion studies, industrial accident prevention, and tests of railroad personnel, as well as articles by physicians, psychologists, economists and labor leaders on technical aspects of personnel matters. The coöperation of such a varied group of specialists is an outstanding feature of this organization established to promote research activities pertaining to personnel in industry, commerce, education, and government, wherever such researches are conducted, not in a partisan spirit or for propaganda, but in the spirit and in the methods of science.

The member organizations are widely distributed—in Philadelphia and Washington, Pittsburgh and Chicago, North Carolina, New Hampshire, Michigan, and Massachusetts.

The plans of the Personnel Research Federation for the coming year, as formulated by its board of governors, include certain studies to be carried forward by the central staff. Major investigations, as heretofore, will be made under the direct supervision of member organizations. The energies of the director and his assistants will be concentrated on the establishment of a clearing house for information about problems, researches in progress, sources of data, and methods of investigation. Existing research facilities and the most promising lines of inquiry will be inventoried to determine opportunities for progress. Much is to be accomplished through the discovery and collection of unpublished reports and notes of research on industrial fatigue and industrial hygiene, including mental hygiene; hiring, placing and training of workers; methods of wage payment; non-financial incentives and rewards; vacations with pay; personnel records and forms; methods of personnel administration, vocational guidance and placement in colleges and schools; selection and development of executives, and other live topics of personnel research on which data are often buried in the files of business concerns, trade associations, labor organizations, government bureaus, and university departments.

Assistance will be available for member organizations, manufacturers' associations, labor groups, and university departments wishing to be brought into touch with authorities on the several aspects of their personnel problems. Joint effort of many co-workers will speed the clear definition of puzzling questions about workers in relation to their jobs and opportunities, and point the way toward the solution of these questions by scientific, impartial, disinterested methods.

Wood-Waste Prevention

THE phrase of the spendthrift, "Plenty more where it came from," cannot be longer used in speaking of the timber supply of the United States. During November the mountainsides of the country were hung with the smoke clouds of forest fires started by the carelessness of men in the parched woods. Forest fires are an obvious waste of precious lumber, but there are many other means of reducing the drain on our wood supply.

As this issue of MECHANICAL ENGINEERING goes to press, a National Conference on Utilization of Forest Products is being held in Washington at the call of Henry C. Wallace, late Secretayr of Agriculture. A large representation of interested organizations and individuals was invited "to consider the unparalleled problem of maintaining a perpetual supply of forest products sufficient to meet the needs of the greatest wood-using nation in the world." Presumably, the conference will be successful in obtaining national recognition of the need for more economical utilization of forest products, which, with forest protection and wood growing, makes a problem that demands for its solution the coöperative intelligence and vision of the American people.

The Department of Agriculture issued a booklet with the call for this conference, and some of the staggering facts included therein are given here in brief as a stimulant to engineering attention and thought.

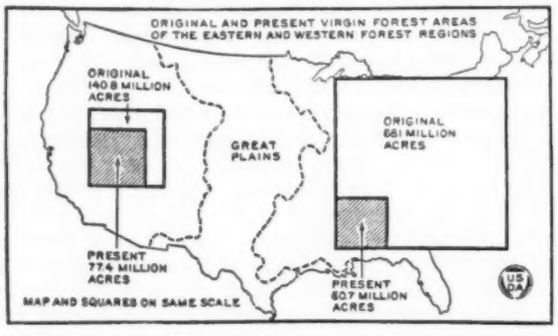
I—Wood-Using Industries Facing Exhaustion of Raw Material. **Wood is the raw material for a group of American industries which ranks approximately third in value of output among all the groups supporting the Nation's economic life. Wood substitutes have multiplied, but no faster than wood uses. Wood shortage means a lowered standard of living and a tremendously costly scrapping of plants and readjustment of industries. To avert it is a national problem of the first magnitude.**

II—Present Timber Supply One-Third of Original Stand. **The present area of forest land in the United States is approximately 469,500,000 acres. This is about 57 per cent of the original forest area, but it has been largely**

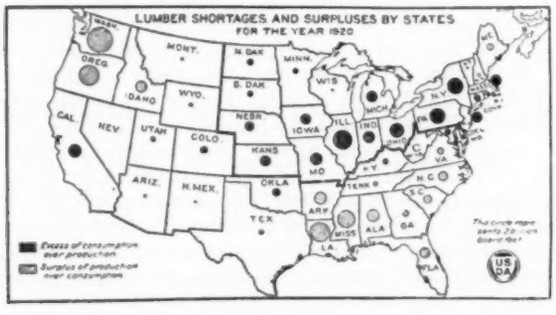
cut and burned over, so that it now bears less than one-third of the country's original forest stand. The proportions are about as follows:

		Acres
Virgin forest		138,100,000
Cut-over and burned-over forest:		
Second growth, saw-timber size	113,800,000	
Second growth, cordwood size	136,400,000	
Non-restocking	81,200,000	
		331,400,000
Total		469,500,000

The total supply of forest material is divided, for convenience, into saw timber and cordwood. Saw timber includes everything large enough to produce sawed stock, such as lumber, railroad ties, and dimension material, under the logging and milling practices current in the different regions,



ONLY A REMNANT OF THE ORIGINAL EASTERN FOREST REMAINS, AND NEARLY HALF OF THE VIRGIN FORESTS OF THE WEST HAVE GONE



THE STATES HAVING BLACK CIRCLES MUST HAUL IN WOOD TO MEET THEIR NEEDS. THE STATES NORTH AND EAST OF THE HEAVY LINE, IN OUR GREATEST INDUSTRIAL AND FOOD-PRODUCING REGION, MUST PAY A HEAVY FREIGHT BILL ON 75 PER CENT OF THE LUMBER THEY USE. A PRACTICAL AND IMMEDIATE MEANS OF REDUCING THIS FREIGHT BILL IS TO CUT THE MANUFACTURED PRODUCTS NEEDED FROM A SMALLER AMOUNT OF LUMBER, WHICH CAN BE DONE BY REDUCING WASTE

and also round stock such as poles, piling, and mine timbers. Cordwood includes all material too small for saw timber.

The total remaining stand of timber is estimated as follows:

	Billion cu. ft.
Saw timber	485
Cordwood	261
Total	746

III—Timber Shortage Will Become General in a Few Years. The present rate of cutting from our forests is about as follows:

	Billion cu. ft. per annum
Saw Timber	11.6
Cordwood	10.8
Total	22.4

In addition to this drain of 22.4 billion cubic feet, there is a waste in the forest itself, from fire, decay, insect attack, and windfall, of about 2.4 billion cubic feet.

It is obvious that if the present rate of drain were to continue unrelieved, and if there were no growth increment, the Nation's entire stand of timber would be wiped out in a comparatively few years—the saw timber in about 37½ years, and the cordwood in about 22 years.

The rate of drain is not likely to decrease; in fact, economic studies point to the conclusion that, although our per capita consumption of wood is declining, our wood requirements will increase from year to year with the increase in population.

The increment of wood through growth is six billion cubic feet a year. Although this growth is mostly on trees now in the cordwood class, it will have its effect in extending the supplies of both saw timber and cordwood, unless lost by fire or premature cutting.

Still the central fact is that we are using up our timber four times as fast as it grows.

IV—Better Utilization an Immediate Recourse. The object of a constructive forest policy is to supply enough timber and other forest products to meet the Nation's needs. Only three lines of action are possible to meet the situation:

a Promoting forest growth
b Promoting forest protection, principally from fire
c Promoting less wasteful manufacture and use of forest products.

If present best practice and knowledge were put into effect to the fullest extent economically feasible, it is estimated that a saving of approximately two-ninths of the present drain on the forests could be accomplished.

V—A Survey of Utilization Losses—Where and How They Occur. Two-thirds of the entire drain on the forest is lost during manufacture and use. Where and how do the losses occur?

One of the largest single items of loss of forest products is decay. The total annual loss by decay during storage and in service is estimated to be the equivalent of over 4 billion cubic feet of standing timber—almost a fifth of the annual drain upon our forests.

In the logging of saw timber for lumber and other sawed products, almost 2.3 billion cubic feet of standing timber per annum is lost or wasted. Woods losses in saw timber manufactured into other than sawed products amount to about 1.2 billion cubic feet every year, and in material smaller than saw timber to almost 2 billion cubic feet per year.

The total of all the woods losses is about 5.5 billion cubic feet per year, or about 24 per cent of the forest drain.

About 55 per cent of the volume of the log as it enters the sawmill emerges as useful product. The remaining 45 per cent is lost in bark, saw kerf, slabs, edgings and trimmings, and culls due to mismanufacture.

The annual gross loss is thus over 2.8 billion cubic feet of standing timber. Since some of this waste is converted into lath, box shooks, and other small products, the net loss is appreciably less.

Mechanical defects such as checks and cracks, loosening of knots, warping, splitting, twisting, cupping, etc. are in general caused by the seasoning process and are usually termed "seasoning defects." They result in a reduction in the quality of the board or in the salable volume, or both. They may occur at almost any period during the manufacture and use of wood.

The sum total of the various seasoning losses represents over 1 billion cubic feet of standing timber per annum, or more than 4 per cent of the forest drain.

Wastes and losses in remanufacture are those which occur in the production of finished articles from lumber and dimension material. The total of all remanufacturing losses exceeds in amount the equivalent of ½ billion cubic feet of standing timber annually.

A total annual loss of at least 1 billion cubic feet of standing timber is caused by waste occurring in a wide variety of forms, each comparatively small in amount, among them the following:

1 Improper design of structures
2 Unsuitable grading rules
3 Failure to use short and odd lengths of lumber
4 Destructive turpentine-orcharding methods
5 Staining of sapwood
6 Wasteful processes in the manufacture of chemical pulp.

VI—Eliminating Now Preventable Wastes Would Save Two-Ninths of the Present Drain on the Forests. Upon the basis of present wastes and losses, the present status of research in forest products, and present economic conditions, the Forest Service has made a detailed estimate of the savings which could be made in the drain on the forest if our best present knowledge were applied throughout all of the various steps in the manufacture and use of forest products *wherever commercially and economically feasible.*

The total of this estimate is 5½ billion cubic feet per year.

This amount is more than two-ninths of the present annual forest drain and nearly equals the total growth of timber over our entire forest area.

A total saving of about ¾ billion cubic feet of standing timber can be realized annually by cutting small dimension stock from woods and mill waste wherever now feasible.

VII—Ultimate Savings Can Double Those Now Feasible. What does the future hold in the way of still better methods? It seems probable that additional savings which may be expected in the future will be as great as those now feasible, in which event the ultimate possible savings would be 10 billion cubic feet per year, or four-ninths of the present drain.

VIII—What Can Be Done to Meet the Immediate Crisis? The following are suggestions as to the nature of the action required. There is no attempt at completeness in either subject matter or detail.

The first thing needful is a recognition by the forest-using industries of the fact that the perpetuation of their supply of raw materials and the permanence of the communities dependent on them demands the immediate adoption of all practicable known methods for preventing wood waste. In this connection it must be borne in mind that forest-using industries include not merely lumbermen and lumber mills, but all of the complex network of industries that depend upon wood.

Secondly, it seems necessary to disseminate, on a truly national scale, knowledge of the present best practice in wood utilization, so that nobody need use wasteful methods because he knows no other.

The third necessity is to iron out the obstacles, often needless and accidental, which separate each piece of wood from its highest possible use. The problem is largely one for industrial surveys, standardization of specifications, and mutual education of buyer and seller.

The fourth thing needful is research. Scientific investigation should forge ahead into the vast field for savings not yet economically feasible but often capable of becoming so with slight improvements in technique.

Fifth, the economic factors bearing on forest utilization should be thoroughly reviewed to see if there are any obstacles to better utilization in the form of transportation rates or rules, tax status, grouping of industries, or the like, which could logically be removed.

Aviation from the Standpoint of the War Department[1]

THE "Round-the-World-Flight" was one of the most notable achievements of our time and one which all the world applauded. The endurance flight of 36 hours, the non-stop and dawn-to-dusk flights across the continent and other accomplishments of the Air Service were remarkable feats. The many records for speed, altitude, distance, and endurance which our aviators have won fill us with pride. But we must remember that two or three world cruisers and four or five racing machines capable of making 250 miles an hour do not make an air force. Today, while we hold a majority of the world's records in aviation, our actual relative strength is growing weaker each year. Our air force is far below the safety point for national defense. We lack a sufficient number of modern planes to train even our small peace force; we lack a sufficient number of trained fliers; we lack an airplane industry capable of supplying our needs in an emergency. Our pilots are flying, to a large extent, planes constructed several years ago, rebuilt and patched up to make them safe. Our actual shortage of planes is getting greater and greater every year. We do not want a large air force capable of aggressive action; but we must have a defensive force adequate for our security. This cannot conceivably be called militarism; it is just common sense.

These deficiencies, serious as they are of themselves, are even more serious when the time element is considered. We cannot train fliers without planes; we cannot build planes quickly without a going industry. Even with adequate manufacturing facilities, which we now lack, it would take six or eight months to supply our first army with planes; nine months to train sufficient fliers to man them. Before that time our troops would have to fight under a heavy handicap with a terrible loss of valuable lives; our large cities, industrial centers, and critical transportation points would be in danger of disastrous bombardment; indeed, the war might be lost before we had begun to fight. This is our present situation. It is up to us to see that it is corrected.

We should not enter into armament races with other nations. That is not the American policy. We need sufficient planes for training and the first shock of defense, sufficient pilots to man them, and an efficient airplane industry to supply our war-time needs. Beyond that we should not go; less than this would court disaster. The annual cost of this insurance would not be great. It would be about equal to twelve hours' expenditures during a war.

We Americans must decide whether we really want a reasonable preparedness for defense, or whether we will take a chance on the future with the certainty of paying heavily if we lose the gamble. If we want a reasonable preparedness, we must be willing to pay a reasonable amount for it. Our best and cheapest investment for the national defense is aviation.

The development of commercial aviation would be of great importance in the national defense. It would keep this vital industry alive, would give us a reserve of trained pilots, and would furnish planes readily convertible to war needs. Commercial aviation abroad is heavily subsidized by the various governments. Last year, England devoted $2\frac{1}{2}$ millions of dollars to civil aviation and subsidies; France, $8\frac{1}{2}$ millions; other nations large amounts. Commercial aviation assists not only in producing the latest types of planes and engines, but also makes possible the continuation of a struggling industry and a nucleus of production personnel and the perpetuation of airplanes design and construction which is so vital in time of need. Our public have not yet been educated to the many advantages of commercial aviation. Even the benefits of the Air Mail, which is making a wonderful record, are not generally appreciated. Whether commercial aviation can survive in this country without a subsidy, I do not know. I would like to see a company organized to carry valuable express matter, not passengers, between several of our large cities. Such a company might pay and pay well in the course of time. It would be a valuable factor in the national defense.

[1] Extracts from an address by Col. Dwight F. Davis, the Assistant Secretary of War, at the banquet of the International Air Meet, Dayton, Ohio, October 3, 1924.

World civilization should advance in direct ratio with the rate which separated communities are brought into contact with the knowledge, thought, and achievements of the world at large. Radio has annihilated distance and the airplane is bringing the far places of the world into ever closer contact. The marvelous inventions of modern science will inevitably bring out changes in every branch of human activity, industrial, social, as well as military, and particularly in the realm of international relationships. The airplane may be a great factor for good, but it also has vast potentialities for evil. Let us bend our every energy to the end that the development of the airplane may mean the advancement, not the destruction, of our civilization.

Bureau of Mines Investigates Possible Hazards in Use of Ethyl Gasoline

IN CONNECTION with the unusual circumstances attending the death of certain individuals employed in the making of tetraethyl lead in the Bayway, N. J., laboratories of the Standard Oil Company of New Jersey, the Department of the Interior, through the Bureau of Mines, calls attention to the difference between tetraethyl lead and ethyl gasoline. These two products, which are quite different, would seem to have become confused in the minds of the public as the result of press accounts of this unusual occurrence. Considerable publicity has been given to the statement that the product causing the poisoning of these persons was ethyl gasoline, the product as sold to the automobile owner. This is erroneous, the Department points out, as the poisoning at the Bayway laboratories occurred in the process of the manufacture of the concentrated tetraethyl lead. This product is not sold to the automobile driver except when tremendously diluted with gasoline, and is not in itself an engine fuel.

One of the outstanding problems confronting the automotive engineer in attempting to construct motors of greater economy is that of eliminating the so-called "knock" from the operation of the engine. It has been demonstrated that this "knock" can be controlled by the addition of small quantities of certain fluids. These materials make it possible to use satisfactorily a lower grade of gasoline and to use engines of a more economical type. The value in fuel conservation, of both increasing the portion of crude oil marketable as motor fuel and also permitting the designing of more efficient engines has been obvious to the Bureau of Mines. The Bureau's attention was called to the possibility of health hazards involved in the use of motor gasoline so treated, in addition to the ever-present hazard of carbon monoxide from exhaust gases. As a result the investigation of the use of these products in motor gasoline was undertaken some months ago. The laboratory work was conducted at the Pittsburgh Experiment Station of the Bureau of Mines under the direct supervision of its technical staff.

One of the most commonly used anti-knock compounds is known as tetraethyl lead. This is added to gasoline in quantity of less than one part of tetraethyl lead in one thousand parts of gasoline by volume, and the resulting mixture is sold on the market as ethyl gasoline.

The danger in the manufacture and handling of the concentrated tetraethyl lead and the possible risk in handling the ethyl gasoline as sold to the automobile driver, are now being investigated, and as soon as sufficient data have been obtained to draw conclusions, the results will be made public.

The possible hazard due to the exhaust gases from automobiles using ethyl gasoline as ordinarily sold has been under investigation for more than ten months, during most of which time various types of animals have been exposed daily to a concentration of exhaust gas from an engine using ethyl gasoline in excess of that known to exist in ordinary traffic of a city street.

After a period of approximately eight months' daily exposure to the above conditions there was no indication of lead poisoning, and the investigation conducted indicates the seeming remoteness of any danger of undue lead accumulation in the streets through the discharging of scale from automobile motors.

The investigation of the possible hazards of lead poisoning from exhaust gases is being continued at the Pittsburgh Station of the Bureau of Mines, together with the first two phases of this study.

Management Week a National Success

THE success of Management Week, held in October for the third consecutive year, was so definite and assured that the Joint Committee in charge of national arrangements has secured the approval of the five coöperating societies for the appointment of a permanent Joint Committee on Management Week, to consist of one member from each society. The new Committee will take up its duties on January 1, 1925, and immediately begin their plans for the Fourth Annual Management Week, to be held next October.

Great credit for the unusual interest aroused in the subject of Budgeting for Better Management this fall is due this year's Joint Committee, which consisted of C. R. Stevenson, Chairman, representing the National Association of Cost Accountants; Sterling H. Bunnell, representing The American Society of Mechanical Engineers; Henry Bruere, representing the American Management Association; W. H. Leffingwell, representing the Taylor Society; and E. M. Robinson, representing the Society of Industrial Engineers. In their efforts they received the coöperation of local joint committees in 65 cities in the United States and Canada, where from one to a half dozen meetings were held on management topics.

Any attempt to accurately measure the results of the intensive concentration on management problems during the third week in October must necessarily be incomplete at this time. Data and statistics were presented which offer opportunity for progress impossible until just such data were made available. The results, therefore, will be progressive and, to a large extent, immeasurable at the present time.

Of all the problems confronting management, that of Budgeting for Better Management was selected upon which to focus attention this year. The Dawes Plan of Reparations had attracted the attention of all civilized countries to the possibilities of the use of the budget; the problems of national and state budgets were being discussed in pre-election speeches. The time, therefore, was ripe for concentration of engineering and scientific minds on this subject. For, although the assets of budgeting in the spending of millions and billions are pretty generally acknowledged, its value in the small business, where thousands instead of millions of dollars are to be expended, is not so generally recognized. The meetings during Management Week aroused a scientific interest in budgeting for all business, large or small, and discussed not only the practical problems in the applications of budgets, but also their stabilizing effects on business when more broadly and intelligently applied.

Possibly nothing shows the status of the Management Week idea in the non-technical field better than the fact that Gov. A. V. Donahey of Ohio issued a formal statement calling attention particularly to meetings arranged at the College of Commerce and Journalism at Ohio State University, and urging their importance upon executives of industrial and other commercial organizations. "The central idea back of the observance of Management Week," said the Governor, "is more efficient management and the elimination of waste in business. This objective is most commendable and should attract the serious interest and support of the men who manage our business establishments." Ohio cities had conspicuous success with their programs. Dayton, Cincinnati, Columbus, Cleveland, and Toledo all held meetings. In Cincinnati the week's program was opened on October 21 at the forum of the Chamber of Commerce addressed by Thomas B. Fordham of Dayton, who is rated as a national authority on budgetary control. Mr. Fordham stressed the point that too little thought is given to working conditions and the contentment of individuals in industrial life, and that budgeting, to be most successful, must coördinate all the executive and administrative forces in industry with the human forces so that the results may be added profits to the business. At a meeting held later in the week, Dr. J. O. McKinsey, head of the department of accountancy of the University of Chicago, and the author of several books on budgeting, sketched the subject of budgetary control and told of its benefits in all lines of business. Dr. McKinsey gave illustrations of dead corporations which had been brought back to life through budgetary control and declared that millions of dollars could be saved annually by the installation of proper budgeting systems.

In New England some of the meetings held were in Boston, Bridgeport, Hartford, New Britain, New Haven, Providence, Burlington, Worcester, Meriden, and Pittsfield. At Boston, Howard Coonley, president of the Walworth Manufacturing Company, told how budgeting had helped to smooth his production over the entire year and decrease his labor turnover. He stated that it was possible for him, in his business, to anticipate conditions six months in advance. At the same meeting Col. B. A. Franklin spoke of the benefits to be derived from comprehensive planning and budgeting, especially as related to advertising and sales expense. Other phases of budgeting were treated by Wm. S. Kemp, Dr. S. W. Stratton, and Dean Wallace B. Donham. Dean Donham summed up his talk by saying that to his mind the greatest value of an attempt at budgetary control came through the coöperation of the personnel of the business it secured. He stated that such a budgetary system, with the coöperation it secures, makes possible internal changes for economy with any company, in anticipation of times of poor business, with at least twice the rapidity obtained in diminishing expenses in an organization operating without a budgetary system.

In the Middle Atlantic States some of the meetings held were in Syracuse, New York City, Buffalo, Elmira, Philadelphia, Plainfield, Baltimore, Erie, Utica, Washington and Pittsburgh. In Buffalo daily meetings were held, numbering ten in all, which had the support of local organizations. The dinner meeting Friday evening was addressed by H. S. Person, managing director of the Taylor Society, on The Kind of Budgeting Required by Industrial Conditions. Dr. Person said in part: "There are five fundamental requisites for industrial budgets: a definite organization, a definite authority and responsibility assigned to each individual, a system of records which makes authority and responsibility effective, a forecasting of the future in terms of organization authority and responsibility, and a constant current appraisal of performance in terms of these forecasts." L. W. Wallace, Executive Secretary of the A.E.C., also attended and addressed this meeting. He described European industrial conditions as he saw them during extensive travels on the Continent last summer.

Meetings in the Southeast included those held in Knoxville, Atlanta, Birmingham, and Richmond. Knoxville was particularly interested in an address by John C. Borden, director of finance of the city of Knoxville, on Problems and Effectiveness of Budgeting in Municipal Administration Work. Knoxville with its city-manager form of government set a new record some months ago in paying a rebate on city taxes, and one of the effective factors in this accomplishment was budgeting. Other topics discussed were Budgeting as Applied to Small Manufacturers, and Budgeting as Applied to Railroads.

In the Central States numerous meetings were held, including four at Milwaukee with a total attendance of about a thousand people and some turned away for lack of room. Dean E. A. Fitzpatrick of Marquette University spoke at one of these meetings on Budgeting the Human Resources of Business. The Milwaukee Public Library furnished book lists on management subjects for distribution at the meetings. Other meetings in the Central States included those held at Minneapolis, St. Louis, Fort Wayne, and Chicago. Among the speakers in Chicago was C. G. Stoll, works manager at the Hawthorne plant of the Western Electric Company, who aptly said that "the essence of successful operation of any industrial establishment is contained in the maxim, 'Plan your work, then work your plan.' "

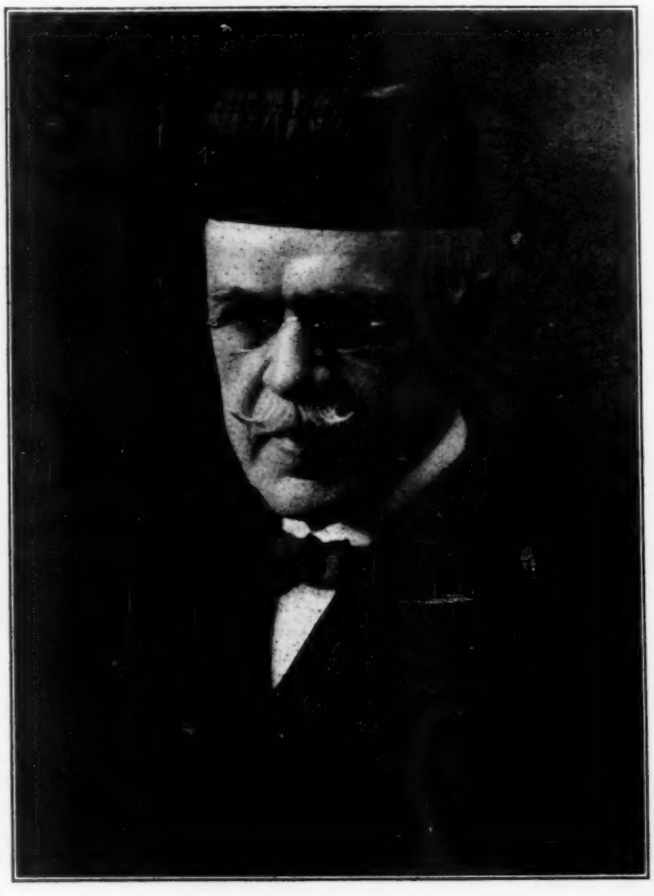
Pacific Coast meetings included those held at Los Angeles, Seattle, and Portland. At the latter city a half-dozen meetings were held by various organizations in the town, including the Business and Professional Women's Club. Los Angeles had five meetings and a number of radio talks.

In Canada, the Toronto Committee arranged for meetings in London, West Toronto, and Montreal, as well as for several in Toronto. This was the first time Management Week had been celebrated in Canada and it was a distinct success.

Henry Robinson Towne

HENRY ROBINSON TOWNE, eighth president of The American Society of Mechanical Engineers and honorary member of the Society since 1921, died at his home in New York City on October 15, 1924.

Mr. Towne came of old English stock, being the direct descendant in the ninth generation from William Towne, who emigrated from Yarmouth, England, in 1640, and who settled at Salem, Mass. His father, the late John Henry Towne, was well known and highly esteemed in the city of Philadelphia, Pa., where, as a member of the firm of Merrick & Towne and of the Port Richmond Iron Works of I. P. Morris, Towne & Co., he was connected with the design and construction of important engineering work, marine engines, sugar machinery and other heavy machines.



HENRY ROBINSON TOWNE

It was in Philadelphia that Henry Robinson Towne was born, on August 28, 1844, his mother being Maria R. (Tevis) Towne. The youth was educated at private schools and at the University of Pennsylvania, followed by a course at the Sorbonne, in Paris, after which his practical shop training was gained in the Port Richmond Iron Works, both in the shop and in the drafting room, leading on to work in charge of erection of machinery in the navy yards of Boston, Portsmouth, and Philadelphia, this experience covering the period between 1862–1865, when the establishment of which his father was an active member was engaged in construction work for the Civil War activities of the Navy Department, including some of the most notable designs of Capt. John Ericsson. During 1866–1867, Mr. Towne traveled and studied engineering in Europe, under the companionship of a notable American engineer, the late Robert Briggs; one of the fruits of that association being an important investigation upon the transmission of power by belting; of which the results appeared in a paper by Briggs and Towne in the Journal of The Franklin Institute in January, 1868.

About the time that Mr. Towne returned from Europe to Philadelphia there had come to that city from Shelburne Falls, Mass., Mr. Linus Yale, Jr., who had for years devoted himself to the invention and production of locks. Yale was seeking two things he lacked—capital and business management—and through personal acquaintances he had been brought in contact with Mr. John Henry Towne, who saw here the possibility of an association in which his son might well be entered. Henry R. Towne perceived at once what Yale had but imperfectly grasped; the possibilities of the small-key pin-tumbler lock as a manufacturing proposition upon what has since been called the quantity-production basis; and the result of the meeting was the formation in 1868 of what was at first called the Yale Lock Company, and which in 1883 became the Yale and Towne Manufacturing Company.

Yale had devoted much of his effort to the design of elaborate and individual locks for banks and vaults, and considered his ingenious pin-tumbler lock as a minor invention. Towne saw the real production advantage of this latter device, which lay in the fact that the tumbler mechanism, contained in a small cylinder separate from the bolt-work case and bulkier part of the lock, permitted thousands of locks to be made by quantity-production methods all alike except for the tumbler cylinder, and that any cylinder set to any combination might then be added to any bolt case to make the completed lock. When to this segregation of the tumbler element from the bolt work was added the great advantage of the small flat key, there appeared an immediate opportunity for the conversion of the lock business from its former status as the personal trade of a locksmith into a commercial manufacturing proposition of almost unlimited possibilities.

The almost unique combination of engineering ability and technical training with executive capacity and economic vision rendered Henry R. Towne the ideal associate for the dreamy inventor, Linus Yale. Stamford, Conn., within convenient reach of New York City, and possessing excellent transportation facilities by rail and water, was selected for the seat of the new enterprise, and there, fifty-six years ago, the small building was erected which became the nucleus of the great works of the present concern.

Hardly had the new enterprise been started when it received a stunning blow in the sudden death of Linus Yale, leaving Henry R. Towne at the age of twenty-four to carry the burden alone. From that date down to the year 1916, when he yielded the presidency to become chairman of the board of directors, the Yale and Towne Manufacturing Company *was* Henry R. Towne. As a great executive he naturally possessed the art of surrounding himself with able associates, but he was always the moving spirit, the presiding genius, and the inspiring director of that famous organization.

Mr. Towne became a member of The American Society of Mechanical Engineers in 1882, and almost immediately the influence of his presence became evident in its councils and in its development. In 1884–1886 he became vice-president of the Society, and as such he presided at the meetings of the year 1886 because the ill health of the president, Dr. Coleman Sellers, rendered the latter unable to attend. In 1889 he was elected president of the Society, a choice which enabled most valuable services to be rendered by him to the organization to which he was so keenly devoted.

It was during his incumbency that the first memorable trip of members of the four national engineering societies was made to England and France, in connection with the Universal Exposition held in Paris in 1889. As the ranking officer among the organizations then represented, Mr. Towne became the logical and welcome leader of the party, his executive ability appearing in the coherent organization effected on shipboard before the members landed in England; and those who had the rare privilege of working with him during that memorable summer have never forgotten the inspiration of his leadership. In England the professional, social, and official events called for the exercise of most tactful dignity; while in France there was required in addition a command of the language which can be appreciated only by those who recall his graceful and fluent response in French to the welcome extended at the reception tendered by M. Gustave Eiffel, as president of the

Société des Ingénieurs Civils de France, upon the occasion of the *dejeuner* given on the platform of the great tower on the Champ de Mars.

The outstanding feature of Mr. Towne's career lay in his broad extension of the scope of the work of the engineer to include the economics of engineering, and the essential union of production and management.

At the Chicago meeting of the Society, in May, 1886, Mr. Towne presented a paper entitled The Engineer as an Economist. So unusual was this topic that many of the members were inclined to regard it as a subject unsuited for presentation to an engineering audience, and it was with misgivings that the publication committee accepted it. Today, when "Scientific Management," "Efficiency," "Quantity Production," and their several extensions are regarded as essentials in engineering, the words of this epoch-making paper may appear somewhat trite, but when it is remembered that the following passages were written nearly forty years ago, the boldness which inspired them will be better appreciated:

"The organization of productive labor must be directed and controlled by persons having not only good executive ability and possessing the practical familiarity of a mechanic or engineer with the goods produced and the processes employed, but having also, and equally, a practical knowledge of how to observe, record, analyze, and compare the essential facts in relation to wages, supplies, expense accounts, and all else that enters into or affects the economy of production and the cost of the product."

"The matter of shop management is of equal importance with that of engineering."

Referring to conditions then existing, Mr. Towne said: "The management of works is unorganized, is almost without literature, has no organ or medium for the interchange of experience, and is without association or organization of any kind."

"The remedy must not be looked for from those who are 'business men,' or clerks or accountants only; it should come from those whose training and experience has given them an understanding of both sides (the mechanical and the clerical) of the important questions involved. *It should originate from engineers!*

In 1889, at the Erie Meeting of the Society, Mr. Towne presented another paper upon the subject of gain sharing, and these two papers were the beginning of what is now recognized as the most important development in industrial engineering of the last fifty years.

Notwithstanding his intense work in the development of the great business of which he was the head, Mr. Towne found time to take part in many widely diversified activities. For five years he was the energetic president of the Merchants' Association of New York; he was most actively interested in the development of the Morris Plan Company of New York, and its president from 1914 to 1918, and chairman of the board until his death. The high responsibility of director in the Federal Reserve Bank of New York was held by him from 1914 to 1919; while among the other important directorships which Mr. Towne held may be mentioned those in the Industrial Finance Corporation, the American Dredging Company, and the Lincoln Safe Deposit Company. He was also treasurer of the National Tariff Commission Association.

In 1868 he married Cora E. White, of Philadelphia, by whom he had two sons, John Henry Towne, now secretary and treasurer of the Yale & Towne Manufacturing Company, and Frederick Tallmadge Towne, whose brilliant career as works manager of the great plant at Stamford was cut short by his lamented death in 1906. Mrs. Towne died in 1917.

Space will not permit the enumeration of Mr. Towne's many contributions to engineering literature, but mention must be made of his important memoir presented before The American Society of Mechanical Engineers in 1906, entitled Our Weights and Measures and the Metric System, in which he presented most forcibly the objections to the compulsory introduction of the metric system into American manufacturing industries, a position which he reiterated most emphatically in one of his latest utterances.

Henry Harrison Suplee.

New York.

Bruno V. Nordberg

DR. BRUNO V. NORDBERG, for more than forty years closely associated with engineering progress and development in the power- and mining-machinery fields, died on October 30, 1924. Dr. Nordberg was born in Finland in 1857 and two years after his graduation in 1878 from the University of Helsingfors he came to this country, believing that it offered greater possibilities in his chosen field. Soon after his arrival he found employment with the E. P. Allis Company, where he had an opportunity to assist in the design of two large vertical blowing engines. The special designer who had been engaged for this work had tired of the conditions and left. Nordberg completed the job and one of these engines is still in use for blast-furnace blowing.

Early in his career he became interested in the improvement of design to effect greater economies. He recognized the possibilities of the poppet valve when used in connection with steam engines, also the opportunity of improving the efficiency of the slide-valve steam engine, provided a better control of steam admission could be obtained. He designed a poppet-valve governor for engines of this type which permitted an economy that was considered impossible at that time. It later became an absolute necessity, in order to utilize the high steam pressures and superheats of modern steam practice. It is the type of valve used today on the Nordberg uniflow engine.

Bruno V. Nordberg

In 1886 the Bruno V. Nordberg Company was organized to engage in the manufacture of governors. The business grew by leaps and bounds, and in 1890 moved to larger quarters and changed its name to the Nordberg Manufacturing Company. Dr. Nordberg followed his natural inclinations and began the design of a line of machinery. The development of the copper country of northern Michigan soon created a demand for power and mining equipment. This was the field for which he was particularly adapted and the result was an increased line of products including steam hoists, engines, compressors, condensers, etc. In 1900 the present plant was built to meet the increasing demands of the business. It covers about 42 acres. Dr. Nordberg recognized the value of a permanent organization and most of the department heads had been in his employ for from 20 to 25 years at the time of his death.

Among the achievements which brought Dr. Nordberg recognition among engineers in this country and in Europe are included the large hoists and compressors for metal-mine service. In 1897 he designed the famous hoist for the Tamarack Mining Company. An unusual design followed in the compound-condensing reel hoist built for the Homestead Mining Company. His greatest achievement in this direction, however, was the building of the mammoth hoist for the Quincy Mining Company at Hancock, Michigan, which exceeds in size any ever attempted and perhaps will be the world's largest for years to come. In addition to the above mentioned steam hoists he designed many unusual hoists for air and electric operation. Some of the largest air compressors and Diesel engines in service in this country reflect his designing skill.

Dr. Nordberg joined the A.S.M.E. in 1893, and was a member of many engineering and scientific societies. The degree of Doctor of Engineering was conferred upon him in 1923 by the University of Michigan in recognition of his skill in the design of special machinery which was a vital factor in the copper development of the state.

Library Notes and Book Reviews

THE Library is a cooperative activity of the A.S.C.E., the A.I.M.E., the A.S.M.E. and the A.I.E.E. It is administered by the United Engineering Society as a public reference library of engineering and the allied sciences. It contains 150,000 volumes and pamphlets and receives currently most of the important periodicals in its field. It is housed in the Engineering Societies Building, 29 West 39th St., New York, N. Y. In order to place its resources at the disposal of those unable to visit it in person, the Library is prepared to furnish lists of references to engineering subjects, copies of translations of articles, and similar assistance. Charges sufficient to cover the cost of this work are made.

The Library maintains a collection of modern technical books which may be rented by members residing in North America. A rental of five cents a day, plus transportation, is charged. In asking for information, letters should be made as definite as possible, so that the investigator may understand clearly what is desired.

A Handbook on Management

MANAGEMENT'S HANDBOOK. By a group of specialists and L. P. Alford, Editor in Chief. The Ronald Press Company, New York, 1924. Flexible binding, 5 × 7½ in., xxxii + 1607 pp. Illus., diagrams, tables. $7.50.

THIS book offers in one reference volume a great quantity of well-selected material in the form of tables, charts, forms, and text relating to the many problems of industrial organization and management.

The subject-matter dealt with is divided into 32 sections, each of which is contributed by a specialist on the subject. The first section, devoted to tables of weights and measures and to industrial statistics compiled from the Census of Manufactures, contains many convenient tabulations not ordinarily available which are frequently of use. The second section, dealing with mathematics, is a well-selected arrangement of rules and principles underlying the many calculations of factory accounting, chart making, and graphic presentation. The subjects dealt with in the remaining chapters are plant layout and maintenance, purchasing, storekeeping, production control, time study and rate setting, wage payment, tariff and shipping, economic principles, cost accounting, budgetary control, insurance, banking relations, industrial relations, marketing, and related subjects.

The text is illustrated by many examples from the practice of representative companies. The subject-matter is conveniently arranged and indexed so that particulars relating to any problem under review, and with which the book deals, may easily be located.

The printing is well done and the illustrations and charts are clear cut. The book is, as it is intended to be, a handbook of proven practices in the organization and management of factories.

Quite naturally, since the machine shop was the first to respond to scientific-management principles, many of the problems presented refer to this class of shop, although not exclusively.

Managers and executive employees of all kinds of factories will find in this book much material of useful reference. It will also be found useful in college classes in industrial engineering.

The book is well balanced in the selection of material and allotment of space.

WALTER RAUTENSTRAUCH.[1]

EVERY science follows the same course in its development, viz., an experimental period during which a vast amount of apparently unrelated data is gathered, a period during which these data are studied and codified, a period in which the laws discovered during the codification are formulated, and finally the period in which the literature of the science begins to take definite form. The science of management has followed this course, and although it is barely twenty years since the first presentation of the possibility of management as a science, the last period has been reached, and already has made a definite impress on the trend of its development. The preparation of handbooks relating to a science marks its final development, for until it has taken definite form and its principles are firmly established, handbooks that translate its principles into practice and show its application to the arts are impossible.

The book under review represents the first attempt to furnish a handbook of the science of management. It offers an answer to the question, "What is management?" and to those who have not kept in close touch with the developments of managerial science in the last ten years the answer will be a surprising one. The science of management began in the experiments of Taylor to find the answer to the question, "How much work should a man do in a day?" At first regarded as a purely local question relating to the machine shop, it was soon discovered that the principles that had found successful application in the machine shop were of almost universal application in every field of human endeavor. Management has been found to comprise the four great divisions of finance, purchase, production, and sales or distribution. Every industry comprises two or more of these divisions, and most industries comprise all. Management's Handbook is an attempt to present in concise form the essential principles and the best practice of these divisions, in all of their ramifications, in such form as to make them useful to the manager, the executive, and the engineer.

In the 32 sections into which the book is divided, the four divisions of management are broken down into a large number of subdivisions, all of which come before the executive at one time or another. The treatment of some of these subdivisions represents the best that has appeared on that particular subject up to the present time. In this class may be mentioned the sections on operation study and rate setting, and on wage payments. For the first time a comprehensive survey of all the diverse methods of attacking these difficult problems is presented, and the manager is given all the data necessary for the solution of his particular case. The section on production control is a veritable mine of information, from which the engineer can obtain much assistance in developing a control in any industry. The section on purchasing and storekeeping outlines the practice of the largest purchasing organization in the world, yet the matter is presented in such form that the smallest manufacturer can make use of it.

It is impracticable in the space of a brief review to point out and comment on all the valuable features of the book. Nevertheless, mention should be made of some of its outstanding features. From the standpoint of finance there are sections on budgetary control, cost accounting, and banking relations. Here the financial executive will find in condensed form all the information he needs, supplemented with references to other literature, if he finds it necessary to pursue the subject further.

In addition to the sections already mentioned as relating to production, there are sections which give the owner or executive the facts that are needed in the planning of the industrial plant, in the selection of its site, its layout, construction, maintenance, etc., in the provision of material-handling equipment, and in the storage of tools and material. Very little that is necessary, from the executive standpoint, has been omitted from these sections. As regards distribution and sales, the sections on market analysis, traffic and shipping, and packing for shipment will afford the sales executive much food for thought.

Several sections appear in the book that are distinctly new departures in the field of management literature. Among these may be mentioned the sections on charts and on conserving and salvaging. The former not only lists the charts that are in use in management—this is the usual treatment of the subject—but also compares the different types and points out the situations

[1] Prof. Indus. Engr., Columbia Univ., New York, N. Y. Mem. A.S.M.E.

in which one is better than the other. The direction for making and using them are especially complete. The section on salvage should prove to be especially useful to those managers that are in doubt as to the disposition of the waste of their plants.

ROBERT THURSTON KENT.[1]

More Book Service

FROM time to time some member of the Society has occasion to consult a rather rare book or a foreign periodical that is not owned by many libraries. In most cases the need can be met by photoprinting the desired article, but there are cases where the length of the memoir makes this too expensive to be practical.

A new ruling by the Library Board will provide for many of these cases. It authorizes loans from the Engineering Societies Library of unusual reference works to public and college libraries, when needed by members of the Founder Societies, under the rules for inter-library loans of the American Library Association.

Application for these loans should come from a library, not an individual. Loans will be made for a limited period and the borrowing library must assume the responsibility for the safe return of the book and the expenses.

The new policy makes the Library more available to members engaged in exhaustive research, and to those in need of treatises in foreign languages. It supplements the popular lending service that was inaugurated last winter to supply modern treatises, and fills a gap that photoprinting has not covered in the reference use of the collection.

The Library can now send the member at a distance an ordinary current text from its lending collection. It can send a reference book, if it is not available in his region or is not in too constant use to be spared. It can photoprint anything it has for him. It has provided the distant member with all the opportunities available to those in New York, so far as it is humanly possible.

Books Received in the Library

ATMOSPHÄRISCHE STÖRUNGEN IN DER DRAHTLOSEN NACHRICHTENÜBERMITTLUNG. By A. Koerts. M. Krayn, Berlin, 1924. (Die hochfrequenztechnik in einzeldarstellungen, bd. 1.) Paper, 7 × 10 in., 151 pp., diagrams, tables, 10 × 7 in., paper. 10 mk.

An investigation of the atmospheric disturbances that affect radio communication and of the extent to which they may be overcome, particularly by methods which diminish their power in proportion to the signal waves emanating from the station. The freedom from disturbances of the various systems of sending now in use is examined, with special attention to the factors that determine freedom from interference. The study is a theoretical one, but was undertaken from the viewpoint of the practical radio engineer and is confined to those questions which appear important in practical application.

AUTOMOBILE GASOLINE, ITS DANGERS AND TESTS. By Augustus H. Gill. Lippincott, Philadelphia [c1923]. Cloth, 5 × 8 in., 57 pp., tables, diagrams, $1.50.

Discusses the manufacture of gasoline, its selection, "improvers" and anti-knock compounds, fires and explosions, and gasoline substitutes. Methods of testing are given, with advice on the interpretation of tests. The book is intended to inform the automobilist about the properties, peculiarities and dangers of gasoline and to tell the chemist how to use and interpret the tests.

DIE BISHERIGEN AUSSCHLÜSSE STEIFER FACHWERKSTÄBE UND IHRE VERBESSERUNG. By Albert Dörnen. Ernst, Berlin, 1924. Paper, 6 × 9 in., illus., diagrams, $0.75.

Presents the results of investigations of riveted joints in structural steelwork, carried out during the years 1920 to 1923. The tests are described in detail and the comparative efficiency of the various usual methods of making riveted joints is shown, together with improved methods devised by the author.

EISENHÜTTENKUNDE, Part I, Das Roheisen. By M. von Schwarz. De Gruyter, Berlin, 1924. Cloth, 4 × 6 in., 128 pp., illus., tables, diagrams, 1.25 gold marks.

A remarkable condensed description of the metallurgy of pig-iron. Opening with a historical and economic survey of the iron industry, the author rapidly considers the properties of the various commercial grades of iron, iron ores, fluxes and slags, blast-furnace fuels, the blast-furnace process, mixers, electric and direct processes, cupolas and air furnaces, and welding processes. A list of important books is included.

ELASTICITY AND STRENGTH. Section 5: Economic Theory of Steel Railroad Bridge Design. By C. A. P. Turner. Published by the author, Minneapolis, Minn., 1924. Cloth, 6 × 9 in., 129 pp., illus., diagrams. $5.

The increase in the weight of railroad rolling stock during the past thirty years has been accompanied, Mr. Turner says, by no improvement in the triangulation of the truss frame to support this increased loading, nor has there been, until now, any theoretical investigation of the number and form of triangular frames which should be combined in a truss to secure maximum stiffness and minimum weight. In the present work these points are discussed and a theory of design presented which indicates considerable savings in weight, with a resulting reduction in cost of material, fabrication, and erection. An appendix contains a general specification for railroad bridges.

ELECTRIC RAILWAY HANDBOOK. By Albert S. Richey. Second edition. McGraw-Hill Book Co., New York, 1924. Fabrikoid, 4 × 7 in., 798 pp., diagrams. $4.

This book brings together in convenient compass, data on subjects that are constantly coming up for consideration by operating, constructing, and designing engineers in everyday practice. Roadbed, track, car houses, shops, train movement, motors, controlling apparatus, current collectors, trucks, braking, cars, transmission, distribution, signals and communication are considered, the essential information being given without attempting to cover in detail all the ramifications of electric-railway engineering into other branches of the profession. The non-technical manager and operator, as well as the engineer, should find the book useful.

This edition has been revised and partially rewritten to include the many changes in practice that have occurred since the original publication of the book.

ELEMENTS OF COST ACCOUNTING. By Anthony B. Manning. McGraw-Hill Book Co., New York, 1924. Cloth, 5 × 8 in., 166 pp., charts. $2.

A textbook intended to supply a simple, yet complete, presentation of the fundamental principles of cost accounting and its connection with the general accounting procedure. This is done by means of graphic charts with explanatory text and by a series of connected problems which are fairly representative of the practical work in the cost department of a factory.

ELEMENTS OF FORESTRY. By Franklin Moon and N. C. Brown. Second edition. John Wiley & Sons, New York. 1924. Cloth, 5 × 8 in., 409 pp., illus., tables. $3.50.

The authors have produced a text that is general in scope and presents the subject in a form easily grasped by the average college student. Among the subjects discussed are the importance of forestry, methods of reproduction and forest management, forest protection, lumbering, the utilization and technology of wood, economics and the regional forests of America. Brief lists of references are given for various chapters.

FOREST MENSURATION. By Herman H. Chapman. Second edition. John Wiley & Sons, New York, 1924. Cloth, 6 × 9 in., 557 pp., diagrams, tables. $5.

A thorough discussion of the measurement of the volume of felled timber and of the growth of trees; intended for those engaged in the purchase or exchange of forest property, the valuation of damages, the planning of logging operations, and the management of forest lands.

A LABORATORY MANUAL OF MACHINE-SHOP PRACTICE. By Jerry H. Service and George E. Frease. D. Van Nostrand Co., New York, 1924. Cloth, 5 × 8, illus., diagrams., $1.25.

Intended to assist the practical machinist without teaching experience to organize and conduct a vocational course in machine-shop practice. It presents a distinct course that can be followed

[1] Supt. Prison Industries of State of New York. Mem. A.S.M.E.

in the shop and is used as a guide for the preparation of lectures. The course is intended for students who wish to become working machinists.

MACHINERY'S HANDBOOK, FOR MACHINE SHOP AND DRAFTING ROOM. Sixth Edition. Industrial Press, New York, 1924. Leather, 5 × 7 in., tables, diagrams, $6.

Although called the sixth edition, this is the first to have been thoroughly revised and enlarged, so that it is markedly changed from the original issue. New material has been added to the extent of 230 pages, 97 tables, and 77 illustrations; other text and tables have been revised and many minor changes made throughout. The book is a most useful collection of the data needed by engineers, skilled workmen, and others engaged in the machine-building industries.

MARINE STRUCTURES, THEIR DETERIORATION AND PRESERVATION; Report of the Committee on Marine Piling Investigations of the Division of Engineering and Industrial Research of the National Research Council. By William G. Atwood and A. A. Johnson. National Research Council, Washington, D. C., 1924. Cloth, 6 × 9 in., 534 pp., illus., maps, tables. $10.

In 1914 shipworms appeared in the northeastern portion of San Francisco Bay, a region previously free from them, and by 1920 practically every timber structure in these waters had been destroyed. A local committee was formed to seek protective measures, but as the magnitude and national importance of the problem grew apparent, the National Research Council was asked to make a national study of the preservation of wooden structures from borers and an investigation of the value and use of substitutes for timber.

The report presents the results of the investigations and forms a convenient presentation of our knowledge of marine borers, of methods for protecting marine structures from them, and of the stability of concrete and metal when exposed to sea water. Reports on the activities of borers are given for all important American harbors. There are extensive bibliographies on marine borers, the preservation of wood, cement and concrete in sea water, and metal in sea water.

MEHRSTIELIGE RAHMEN. By A. Kleinlogel. Ernst, Berlin, 1924. Paper, 6 × 9 in., diagrams, 33.60 Swiss francs, or about $6.25.

A labor-saving handbook for the structural designer. Its sixteen chapters contain a comprehensive collection of statically indeterminate systems that occur frequently in structural work, beginning with simple unsymmetrical members with one support and extending to complicated roof and floor trusses. The most frequently used formulas for the influence lines and for the shearing stresses are given for each case under various load conditions. The book should save much time in calculation.

MOTOR TRUCKS; APPLIED MECHANICS FOR OWNERS AND DRIVERS. By Edward E. La Schum. U. P. C. Book Co., New York, 1924. Cloth, 6 × 9 in., 325 pp., illus. $4.

A reference book for truck operators by the general superintendent of motor-vehicle equipment for the American Railway Express. Describes in detail the various forms and types of trucks, explains their merits and demerits, and gives advice on their maintenance. A chapter on performance and maintenance records is included.

NITROGLYCERIN UND NITROGLYCERINSPRENGSTOFFE (Dynamite). By Phokion Naoum. Julius Springer, Berlin, 1924. Cloth, 6 × 9 in., 416 pp., illus., diagrams, tables. $4.

A comprehensive treatise on this important group of explosives, which includes both an account of the most modern technical methods of manufacture and also of scientific research upon the questions that relate to nitroglycerin and the nitroglycerin explosive.

The first section, on nitroglycerin, describes its manufacture, its physical and chemical properties and its character as an explosive. The second section is devoted to the lower nitrates of glycerin and to esters homologous to nitroglycerin, which have theoretical or practical interest to students of explosives. In the third section the manufacture of dynamite, blasting gelatin and the other nitroglycerin explosives is considered. The author, who is director of the research laboratory of the Nobel factory in Hamburg, has had long practical experience in the industry.

PROTECTION OF STEAM TURBINE DISK WHEELS FROM AXIAL VIBRATION. By Wilfred Campbell. General Electric Co., Schenectady, 1924. Cloth, 8 × 10 in., illus., diagrams, $1.

This work describes the main features of an extensive investigation of the various forms of vibration and waves which may exist in turbine disk wheels, carried out by the General Electric Co. The investigation resulted in the determinations of methods for designing and testing which insure freedom from axial vibration. The book was presented as a paper before The Ameriean Society of Mechanical Engineers in 1924.

RAILWAY TRANSPORTATION, PRINCIPLES AND POINT OF VIEW. By Sidney L. Miller. A. W. Shaw Co., Chicago, 1924. Cloth, 6 × 8 in., maps, tables, diagrams, $4.

A discussion of the railroad "problem" from the point of view of the public, written for those who wish a better understanding of it, as a basis for its solution.

After a discussion of the relation of transportation costs to social and trade development, the author sets forth the growth of our railroad system and shows the existing grouping of railroads by ownership as well as by territory. The economics of operation and the problems pressing for solution are discussed. The author takes up the conception of the railroad as a competitive enterprise, points out the growth of coöperation, analyzes capitalization and explains the different bases for determining the true worth of railroads. The question of rate making is presented, and consideration is given to government regulation.

RELATIVITY FOR PHYSICS STUDENTS. By G. B. Jeffery. E. P. Dutton & Co., New York, 1924. Cloth, 5 × 8 in., 151 pp. $2.40.

The series of lectures here collected were delivered to students of physics at King's College, London. They are intended to introduce the Einstein theory to students of science who are able to make some use of mathematics as an instrument of thought but who may not be ready to face the mathematical analysis which is essential for the thorough exploration of the subject in all its ramifications.

STEAM AND OTHER USEFUL TABLES FOR ENGINEERS AND STEAM USERS. By P. W. McGuire. E. & F. N. Spon, London, 1924. Cloth, 2 × 3 in., tables, 2 shillings.

Mr. McGuire has selected the data most frequently needed by boiler designers, stationary and marine engineers and other data concerned in the generation of steam, and publishes them in a minute volume that slips easily in the vest pocket. His steam tables are based on Professor Callendar's results.

WATERPROOFING TEXTILE FABRICS. By Herbert P. Pearson. Chemical Catalog Co., New York, 1924. Cloth, 6 × 9 in., illus., tables, diagrams, $3.

Presents the principles underlying the processes for rendering cloth waterproof or water-resistant, and describes those which have been used on a large scale in the United States and Europe. Methods for testing the process are given, and there is a list of the processes and formulas patented in the United States, Great Britain, France and Germany since the year 1900. The book is a useful addition to the meager literature on the subject, written for users rather than manufacturers, but of value to both.

WIRELESS POSSIBILITIES. By A. M. Low. E. P. Dutton & Co., New York, 1924. Cloth, 5 × 6 in., diagrams, $1.

Calls attention to some of the things that wireless cannot do today but which may become possible hereafter.

WÄRME UND WÄRMEWIRTSCHAFT DER KRAFT- UND FEUERUNGSANLAGEN IN DER INDUSTRIE. By Wilhelm Tafel. R. Oldenbourg, Münich and Berlin, 1924. Paper, 7 × 10 in., 363 pp., diagrams, tables. $9.50.

Prepared with the needs in mind of students in technical colleges who expect to become operating engineers, factory chemists, etc., and thus to be interested in the generation of power and in industrial heating but not with questions of design. The book brings together the information on methods of heat utilization for power and heating which is necessary for the proper selection and operation of prime movers and furnaces and for meeting the thermal needs of the factory as a whole. In the concluding section of the book the general principles are applied specifically to the problems of the iron and steel works and the paper mill.

LAST-MINUTE ADDITIONS TO

THE ENGINEERING INDEX

Registered United States, Great Britain and Canada

Exigencies of publication make it necessary to put the main body of The Engineering Index (p. 171-EI of the advertising section) into type considerably in advance of the date of issue of "Mechanical Engineering." To bring this service more nearly up to date is the purpose of this supplementary page of items covering the more important articles appearing in journals received up to the third day prior to going to press.

AIR COMPRESSORS

Five-Stage. Five-Stage Air Compressor. Engineering, vol. 118, no. 3066, Oct. 3, 1924, pp. 498–499, 4 figs. Designed by Belliss & Morcom for supplying high-pressure air for coal-mine locomotives used for underground haulage.

AIRPLANES

Light, Use as Models. Use of the Light Planes in Aeronautical Research, W. L. Lepage. Aviation, vol. 17, no. 16, Oct. 20, 1924, pp. 1169–1170. Notes on obtaining experimental data; flight tests of scale models; question of weight.

ALLOYS

Light. Light Alloys, J. B. Swan. Automobile Engr., vol. 14, no. 194, Oct. 1924, pp. 293–300, 9 figs. General survey of modern practice; parts of automobile suitable for light-alloy castings; magnesium alloys; casting alloys suitable for stock loading; piston alloys; alloys suitable for forging purposes; duralumin; magnalite; aluminum as bearing metal; light alloys and hardness; Air Board, U. S. Navy and other alloys.

AUTOMOBILE ENGINES

Anti-Detonator for. Tetra-Ethyl Lead as an Anti-Detonator in High-Compression Engines, H. K. Thomas. Automobile Engr., vol. 14, no. 194, Oct. 1924, pp. 308–311, 9 figs. Results of author's experiments.

AUTOMOBILE MANUFACTURING PLANTS

Machine-Shop Economies. Possible Economies in Automotive Machine-Shop Operations, A. L. De Leeuw. Soc. Automotive Engrs.—Jl., vol. 15, no. 5, Nov. 1924, pp. 418–425. Indicates by examples certain important economies that might be introduced in shops, especially those which can be effected without much capital outlay; discusses auxiliaries and one definite operation, drilling, has been chosen as chief example. See also Am. Mach., vol. 61, nos. 19 and 20, Nov. 6 and 13, 1924, pp. 735–738 and 765–770.

AUTOMOBILES

Maybach. German-Built Automobile Operates Without Shifting Gears, B. R. Dierfeld. Automotive Industries, vol. 51, no. 19, Nov. 6, 1924, pp. 810–815, 14 figs. Maybach car uses planetary low-speed gear only under extremely difficult road conditions; electric starter normally starts car on direct drive; engine and carburetor possess original features.

BONUS SYSTEMS

Tool-Room Application. Bonus System Applied to Tool Department. Iron Age, vol. 114, no. 19, Nov. 6, 1924, p. 1219. Bonus system for tool-room use; making of dies expedited with resultant lower cost.

CASTING

Copper. Making Copper Castings from Cupola Melted Metal, T. F. Jennings. Foundry Trade Jl., vol. 30, no. 427, Oct. 23, 1924, pp. 346–347, 1 fig. Common causes of defects in copper castings; need for deoxidizers; furnace factors; use of cupola in melting copper; cupola preparation; phosphor copper as deoxidizer; hardening copper; pouring heavy castings. Paper read before Am. Foundrymen's Assn.

CENTRAL STATIONS

Fort Dodge, Ia. New Plant at Fort Dodge Shows High Economy. Power, vol. 60, no. 18, Oct. 28, 1924, pp. 676–681, 10 figs. Plant of 5000-kw. cap. using steam 550 deg. fahr., shows boiler-room economy of 85 per cent; equipped with economizers, two-effect evaporator system with bleeding from main units, underfeed stokers, two induced-draft fans per boiler and motor drive for auxiliaries; simple coal-handling installation. Summary of equipment.

Superpower. Five New Superpower Steam Stations. Elec. World, vol. 84, no. 84, no. 16, Oct. 18, 1924, pp. 834–838, 5 figs. Turbo-generators totaling 465,080 kw. in 13 units being installed at Toronto (O.), Chicago, Long Beach, Kearny, and Peoria; ultimate rating of plants to be 1,392,000 kw.

CYLINDERS

Locomotive, Machining. How the American Locomotive Company Machines Cylinders and Bushings, L. C. Morrow. Am. Mach., vol. 61, no. 18, Oct. 30, 1924, pp. 675–679, 15 figs. Laying out cylinders for boring and planing; machining operations; testing hydraulically; setting up and assembling cylinders; operations on cylinder and valve-chamber bushings.

DIESEL ENGINES

Double-Acting. The Worthington 2-Cycle Double-Acting Diesel Engine. Engineering, vol. 118, no. 3066, Oct. 3, 1924, pp. 482–486, 10 figs. Describes types constructed by Worthington Pump & Machy. Corp. of Buffalo, N. Y.

ELECTRIC LOCOMOTIVES

Direct-Current. Electrical Engineering Exhibits—The British Empire Exhibition. Engineer, vol. 138, no. 3588, Oct. 3, 1924, pp. 370–374, 17 figs. partly on p. 382. Describes d.c. locomotives exhibited by Metropolitan-Vickers Elec. Co., and controlling equipment for 1500-hp. 3300-volt a.c. winder exhibited by Allen West & Co.; other exhibits.

FLOW OF LIQUIDS

Liquid Meters. The Bassler Liquid Meter. Engineering, vol. 118, no. 3066, Oct. 3, 1924, pp. 497–498, 4 figs. Instrument is guaranteed to give measurements with error of less than 0.1 per cent over temperature range of 150 deg. fahr., and irrespective of changes in viscosity of fluid or of pulsations and irregularities in rate of flow.

FOUNDRIES

Departmental Costs. Departmental Costs in the Foundry, H. B. May. Foundry Trade Jl., vol. 30, no. 426, Oct. 16, 1924, pp. 333–335. With departmental costs profitable and non-profitable lines are clearly recognized, thus enabling sales department to choose line for their greatest effort; source of cost data; divisions of foundry costs; melting and annealing costs; cleaning and finishing costs, etc. Paper read before Am. Foundrymen's Assn.

GEARS

Design Chart. A Design Chart for Industrial Gears, T. F. Stacey. Am. Mach., vol. 61, no. 17, Oct. 23, 1924, pp. 643–644, 1 fig. Presents chart which permits selection of proper gear without any mathematical calculations.

GRINDING MACHINES

Plunge-Cut. Plunge-Cut Grinder. Iron Age, vol. 114, no. 19, Nov. 6, 1924, p. 1199, 2 figs. Wide-wheel, in-feed machine with reciprocating spindle adapted to production work; placed on market by Cincinnati Grinder Co. See also Machy. (N. Y.), vol. 31, no. 3, Nov. 1924, pp. 229–230, 3 figs.

INDUSTRIAL MANAGEMENT

Cost Control. Statistical Summary and Abstract. Indus. Mgt. (N. Y.), vol. 68, no. 4, Oct. 1924, pp. 198–220. Details of practice in cost organization and in executive utilization of cost data obtained from 160 American industrial concerns employing aggregate of 500,000; tabular summary of cost-control practice in 160 plants (on supp. table); relation of timekeeping to cost work in 64 plants; relation of rate setting to cost; relation of cost department to control of materials; procedure with respect to compilation and distribution of overhead; how 57 concerns use cost data to prevent excessive costs; how foremen are brought in touch with cost and expense records, steps taken in 65 plants to reduce material investment; how 30 concerns handle idle facilities; steps taken to analyze and reduce shrinkage of materials; how cost analysis dictates programs of economies; use of employees' suggestion plan and its relation to costs; outstanding ways in which 78 industrial concerns use cost data for executive control. Points embraced in questionnaire which forms basis for summarized data, p. 197.

Routing. Perspective Routing, P. K. Guillow. Indus. Mgt. (N. Y.), vol. 68, no. 4, Oct. 1924, pp. 242–243, 4 figs. Time-saving suggestion for intelligent routing of production.

Plant-Maintenance Work. Organizing for Plant Maintenance Work, L. A. Blackburn. Soc. Automotive Engrs.—Jl., vol. 15, no. 5, Nov. 1924, pp. 440–444 and 448, 6 figs. Outlines plan of organization for large manufacturing plant; various departments of such organization, including policing of plant, protection against fire, maintaining plant in sanitary condition, removal of waste material, operation of power plant, inspection and repairing motors and metering devices, etc.

INTERFEROMETERS

Calibrating Standards of Length. Interferometers for Calibrating Standards of Length. Engineering, vol. 118, no. 3066, Oct. 3, 1924, pp. 491–492, 2 figs. Describes apparatus made by Adam Hilger, Ltd., by which accurate standards of length can be originated; apparatus was ordered by Japanese Government because meter has been adopted as sole legal standard of length, and authorities wished to have apparatus by which residual error in existing international standard could be accurately measured, and other standards produced.

LATHES

Engine. Unusual Engine Lathe Operations. Machy. (N. Y.), vol. 31, no. 3, Nov. 1924, pp. 207–211, 12 figs. Contains following articles: Arc Grinding in the Lathe, R. A. Black; Boring Concentric Slots, Phil. F. Shafran; Internal Spherical Turning, M. W. Kotawba; Deep-Hole Drilling Job, G. W. Jager; Winding a 300-Foot Coil Spring, J. J. Appel.

MACHINE SHOPS

Tooling for Small-Quantity Work. Tooling for Small Quantity Work, L. S. Love. Iron Age, vol. 114, no. 19, Nov. 6, 1924, pp. 1193–1196, 11 figs. Jobs not calling for bulk production put through on semi-production basis; savings accomplished by grouping operations. Practice at Schenectady works of Gen. Elec. Co.

MACHINE TOOLS

Automatic Machines. Designing Automatic Machines, A. A. Dowd. Machy. (N. Y.), vol. 31, no. 3, Nov. 1924, pp. 212–215, 5 figs. Procedure in design, and use of simple models for analyzing problems met with.

PRESSES

Coining, Forging in. Coining-Press Operation, A. R. Kelso. Soc. Automotive Engrs.—Jl., vol. 15, no. 5, Nov. 1924, pp. 399–406, 19 figs. Outlines development and tells how such machinery was adapted to speed up production of automobile parts, such as forged arms and levers, by squeezing process that superseded milling or spot-facing methods; details of squeezing operations and increase in production over that attained under former methods; photomicrographs showing grain structure of coin-pressed forgings. See also (abstract) in Am. Mach., vol. 61, no. 18, Oct. 30, 1924, pp. 685–688, 11 figs.

PULVERIZED COAL

Installation for Industrial Plant. Clark Thread Co. Installs Pulverized-Fuel Equipment. Power, vol. 60, no. 19, Nov. 4, 1924, pp. 714–719, 10 figs. Typical pulverized coal installation for industrial plant; furnaces of 4270-sq. ft. Stirling boilers remodeled to burn either pulverized coal or oil; preparation plant is adjacent to point of unloading and coal is transported in pulverized form through 5-in. pipe line (placed underground) a distance of 600 ft. to boiler plant.

Sheet Mills. Pulverized Coal Used as Fuel in Sheet Mills, J. Glew. Iron & Steel Engr., vol. 1, no. 10, Oct. 1924, pp. 553–554, 4 figs. It has been found that where continuous-type furnaces have been used results have been much more gratifying than when batch-type furnace is employed; methods of using pulverized coal to get best results; design of furnace.

SCREW THREADS

Grinding Machine for. The Wolseley Thread-Grinding Machine. Engineering, vol. 118, no. 3068, Oct. 17, 1924, pp. 546–548, 9 figs. Machine exhibited at British Empire Exhibition is suitable for production of gages, taps, and dies to very fine limits.

STEAM

High-Pressure. Steam Generation at Extra High Pressures, V. Blomquist. Power, vol. 60, no. 19, Nov. 4, 1924, p. 745, 2 figs. Discusses economy of power generated by back-pressure turbine; improvements in economy which can be produced by bleeding steam for heating feedwater; points out that rotating tube boiler is practical solution of problem of high-pressure steam generation. (Abstract.) Paper presented at World Power Conference.

STEAM GENERATORS

Electric. Electric Steam Generators, L. G. de Kermor. Eng. Jl., vol. 7, no. 11, Nov. 1924, pp. 673–677, 9 figs. Their development efficiency and operating costs; how they solve problem of utilization of surplus and off-peak energy.

STEAM POWER PLANTS

Swedish Practice. Outstanding Features of Swedish Practice in Steam Power Production, H. A. Lundberg. Engineering, vol. 118, no. 3066, Oct. 3, 1924, p. 503. Points out that steam power in Sweden is mostly used for traction purposes and only in smaller degree for driving of mills; describes interesting types of plants and arrangements, typical of Swedish practice. (Abridged.) Paper read before World Power Conference.

STEAM TURBINES

Diaphragm Blades. Making Steam Turbine Diaphragm Blades. Iron Age, vol. 114, no. 17, Oct. 23, 1924, pp. 1047–1051, 10 figs. Steel-foundry practice at Schenectady works of Gen. Elec. Co.; novel planer fixture permits planing at several angles with one clamping; centrifugal babbitting of large bearings; unusual radius tool.

Impulse Blades and Nozzles. The Proportioning of Impulse Blades and Nozzles, G. Stoney. Engineering, vol. 118, no. 3066, Oct. 3, 1924, p. 473, 3 figs. Consideration of effect of each factor involved in proportioning of blades and nozzles, and investigation of influence that error in assumed values of these factors has on final results.

Performance Determination. Turbine Performance from Steam-Quality Measurements, N. L. Johnson. Power, vol. 60, no. 18, Oct. 28, 1924, pp. 691–692, 1 fig. Points out that Thomas meter makes it possible to extend determination of turbine performance by measurements of steam quality to cases where exhaust steam is wet.

STEEL

Cold Working. Cold-Working Steel Bars and Strips, S. Ashton Hand. Am. Mach., vol. 61, no. 17, Oct. 23, 1924, pp. 637–639, 6 figs. Annealing methods and temperatures at plant of Lancaster Steel Products Corp., Lancaster, Pa.; pickling, and neutralizing effect of acid; machines for drawing, straightening and cutting round stock; slitting and rolling strip steel.

WAGES

Group Wage-Payment Plan. The Group Wage-Payment Plan, H. G. Perkins. Soc. Automotive Engrs.—Jl., vol. 15, no. 5, Nov. 1924, pp. 464–466. Fundamental requirements for success of system; outstanding results; reduction of labor cost and after effect; influence of employment situation; executives are kept better informed.

THE ENGINEERING INDEX

(Registered United States, Great Britain and Canada)

THE ENGINEERING INDEX presents each month, in conveniently classified form, items descriptive of the articles appearing in the current issues of the world's engineering and scientific press of particular interest to mechanical engineers. At the end of the year the monthly installments are combined along with items dealing with civil, electrical, mining and other branches of engineering, and published in book form, this annual volume having regularly appeared since 1906. In the preparation of the Index by the engineering staff of The American Society of Mechanical Engineers some 1200 technical publications received by the Engineering Societies Library (New York) are regularly reviewed, thus bringing the great resources of that library to the entire engineering profession.

Photoprint copies (white printing on a black background) of any of the articles listed in the Index may be obtained at a price of 25 cents a page. When ordering photoprints identify the article by quoting from the Index item: (1) Title of article; (2) Name of periodical in which it appeared; (3) Volume, number, and date of publication of periodical; (4) Page numbers. A remittance of 25 cents a page should accompany the order. Order should be sent to the Engineering Societies Library, 29 West 39th Street, New York.

(See also page 58 of this issue for supplementary items.)

ACCIDENT PREVENTION

Traffic Accidents. The Prevention of Traffic Accidents, H. E. Blain. Inst. Transport—Jl., vol. 4, no. 7, May 1923, pp. 254–270, 9 figs. Statistics of railway and street accidents, and account of appliances and methods utilized in what is known as "safety campaign."

ACCIDENTS

Industrial. Industrial Accidents and Hygiene, Lucian W. Chaney. Monthly Labor Rev., vol. 17, no. 4, Oct. 1923, pp. 131–149. Accident occurrence in iron and steel industry, 1922; coal-mine fatalities in United States in 1922; mine fatalities due to use of explosives; relation between labor turnover and industrial accidents; analysis of causes of 350,000 industrial accidents; industrial accidents in rubber industry; Austrian legislation for prevention of industrial poisoning; industrial poisons and diseases in British factories.

AERONAUTICAL INSTRUMENTS

Meteorographs. A New Airplane Meteorograph (Ein neuer Flugzeug-Meteorograph), Albert Wigand and Heinrich Koppe. Zeit. für Flugtechnik u. Motorluftschiffahrt, vol. 14, no. 13–14, July 26, 1923, pp. 106–108, 3 figs. Details of new meteorograph and desiderata upon which design is based; describes how it should be attached to airplane.

Types. Measuring Instruments for Aeroplanes, E. Everling and H. Koppe. Eng. Progress, vol. 4, no. 6, June 1923, pp. 111–115, 17 figs. Service requirements; pressure meters; statoscopes; temperature; speed; climbing; turning.

AIR COMPRESSORS

Turbo-Compressors. Modern Types of Large Compressors in Mining Practice (Neuzeitliche Grosskompressoren im Bergwerksbetrieb), Ernst Blau. Fördertechnik u. Frachtverkehr, vol. 16, no. 15, Aug. 3, 1923, pp. 171–173. Describes design and use of turbo-compressors and electrically driven compressors in mines.

AIR COOLING

Buildings. Cooling Systems for Buildings, A. M. Feldman. Am. Architect & Architectural Rev., vol. 124, no. 2431, Oct. 24, 1923, pp. 379–384, 10 figs. Describes cooling equipment installed at banking offices of Kuhn, Loeb & Co., New York City, Mt. Sinai Hospital, New York City, and country residence of Paul M. Warburg at Hartsdale, N. Y.

AIR FURNACES

Oil-Fired. Burning Oil in the Air Furnace, A. V. Landschoot. Foundry, vol. 51, no. 21, Nov. 1, 1923, pp. 862–867, 4 figs. Successful adaptation to melting malleable iron requires proper combustion, close control of heat and attention to charge time element.

AIRPLANE ENGINES

Calculations. Aero-Engine Calculations. Practical Engr., vol. 68, no. 1907, Sept. 13, 1923, pp. 143–154. Formulas giving horsepower required to propel an airplane; calculation for power to drive gear-driven compressor; exhaust-gas turbo-compressor calculations; etc.

Distribution in Multi-Cylinder. The Arithmetic of Distribution in Multi-Cylinder Engines, Stanwood W. Sparrow. Nat. Advisory Committee for Aeronautics—Tech. Notes, no. 162, Oct. 1923, 23 pp., 15 figs. Consideration of effect on engine performance of known inequality of distribution.

AIRPLANES

Airfoils. Note on the Experimental Aspect of One of the Assumptions of Prandtl's Aerofoil Theory, N. A. V. Piercy. Roy Aeronautical Soc.—Jl., vol. 27, no. 154, Oct. 1923, pp. 501–511, 3 figs. Note is confined to assumption whereby vorticity in strictly limited region is in effect substituted for part of general action of viscosity; it is shown that viscosity as such is of fundamental importance in determining system of flow.

On the Vortex Pair Quickly Formed by Some Aerofoils, N. A. V. Piercy. Roy. Aeronautical Soc.—Jl., vol. 27, no. 154, Oct. 1923, pp. 488–500, 3 figs. Results of tests carried out in 4-ft. wind tunnel of aeronautical laboratory of East London College; author seeks to show that wing tip vortices are amenable to accurate investigation; deals with structure of vortex well on into turbulent flow.

The Supporting Vortex Surface as an Aid in the Treatment of Plane Problem of the Airfoil Theory (Die tragende Wirbelfläche als Hilfsmittel zur Behandlung des ebenen Problems der Tragflügeltheorie) W. Birnbaum. Zeit. für angewandte Mathematik u. Mechanik, vol. 3, no. 4, Aug. 1923, pp. 290–297, 3 figs. It is shown how Prandtl's theory of "supporting vortex" can be used to include distribution of lift according to depth of airfoil in calculation, and to find dependence of this distribution on form of profile.

Theoretical Relationships for the Lift and Drag of an Aerofoil Structure, H. Glauert. Roy. Aeronautical Soc.—Jl., vol. 27, no. 154, Oct. 1923, pp. 512–518. Aerodynamic problems; cyclic flow; two-dimensional and three-dimensional problem.

Angular Velocity in Pitch. A Study of Controlability, Angular Velocity and Dynamic Stability of an Airplane About the Axis of Pitch, Leslie MacDill. Air Service Information Circular, vol. 5, no. 418, Apr. 1, 1923, 14 pp., 7 figs. Analysis of problem involving variations in longitudinal and vertical velocity, and angular velocity in pitch; study of steady motion and of small oscillations.

Boulton and Paul. The Boulton and Paul "Bodmin." Flight, vol. 15, no. 36, Sept. 6, 1923, pp. 528–533, 10 figs. Details of British all-metal biplane, incorporating unusual feature of twin engines placed in fuselage, with transmission drive to propellers placed on wings.

Carriers for. British Navy Aircraft Carriers. Engineering, vol. 116, no. 3018, Nov. 2, 1923, pp. 564–565, 8 figs. on supp. plates. Particulars of four carriers now on service or completing, three of which were converted for their present service, only one being specifically designed.

Climbing Ability. Determination of Climbing Ability, H. Blasius. Nat. Advisory Committee for Aeronautics—Tech. Notes, no. 166, Nov. 1923, 18 pp., 8 figs. Examination of conditions which shorten or lengthen climbing time. Translated from Technische Berichte, vol. 3, no. 6.

Cycleplane. Requirements of a Man Propelled Airplane, Matthew B. Sellers. Aviation, vol. 15, no. 20, Nov. 12, 1923, p. 608. Consideration of requirements and limitations of machine such as Gerhart cycleplane with propeller actuated by foot power.

De-Havilland-53. The De Havilland-53 Light 'Plane. Flight, vol. 15, no. 39, Sept. 27, 1923, pp. 576–580, 12 figs. A low-wing monoplane, with two halves of wing hinged to fuselage and braced by compression struts above wing; 750-cc. Douglas engine; maximum speed about 70 m.p.h.

Design. Aeroplane Design, H. P. Folland. Instn. Aeronautical Engrs.—Proc., no. 3, 1922, pp. 3–19 and (discussion) 19–38, 27 figs. Author goes over preliminary design and gives rough approximations; draws attention to importance of detail design and points which go toward reliability, efficiency and engineering structure.

Constructional Design of Aeroplanes, C. W. Tinson. Instn. Aeronautical Engrs.—Proc., no. 4, 1922, pp. 3–26. Abstract of paper in three sections, including discussions.

Dietrich D.P.II and D.P.III. Two More New German Aeroplanes. Aeroplane, vol. 25, no. 11, Sept. 12, 1923, p. 276, 2 figs. Describes D.P.II, a two-seater cantilever-type biplane, fitted with either 5-cylinder 55-hp. or 7-cylinder 70–80-hp. Siemens-Halske engine; and the D.P.III, a six-passenger cantilever monoplane, fitted with any engine of about 230 hp., both produced by Dietrich Gobiet Flugzeugwerke A. G.

Flying Boats. See FLYING BOATS.

Gliders. The New Rhön Gliders (Die neuen Rhön-Segelflugzeuge), W. v. Langsdorff. Motorwagen, vol. 26, nos. 25 and 26, Sept. 10 and 20, 1923, pp. 378–381 and 393–398. Details of participating machines in Rhön competition, 1923.

The Sinking Speed of Gliders (Die Sinkgeschwindigkeit der Segelflugzeuge), H. B. Helmbold. Zeit. für Flugtechnik u. Motorluftschiffahrt, vol. 14, no. 15–16, Aug. 31, 1923, pp. 121–122, 2 figs. Approximate method, with aid of alignment chart, of determining direct aerodynamic relation of minimum sinking speed to main dimensions of airplane.

Gothenburg Exhibition. Gothenburg International Aero Exhibition. Flight, vol. 15, nos. 30, 31, 32, 33 and 34, July 26, Aug. 2, 9, 16 and 23, 1923, pp. 423–432, 445–453, 481–484 and 508–511, 68 figs. Exhibits of Sweden, Holland, Italy, Czechoslovakia, Great Britain, France and Germany.

Hangars. See HANGARS.

Heinkel. Progress in Airplane Construction (Neue Fortschritte im Flugzeugbau), R. Otte. Zeit. für Flugtechnik u. Motorluftschiffahrt, vol. 14, no. 13–14, July 26, 1923, pp. 104–106, 7 figs. Details of Heinkel H. E. 3 monoplane which can also be used as seaplane.

Model Tests Without Wind Tunnel. Experimental Data Without a Wind Channel, O. T. Gnosspelius. Instn. Aeronautical Engrs.—Proc., no. 5, 1923, pp. 3–10 and (discussion) 11–17, 3 figs. Description of testing method, its advantages and disadvantages; mathematical analysis of lift and drag forces from pendulum observations.

Motorgliders. Lympne—Comments and Criticism. Aeroplane, vol. 25, no. 17, Oct. 24, 1923, pp. 419–420, 422 and 424, 2 figs. Technical comments of competition results as a whole and review of more striking peculiarities of individual competing machines.

On Motor gliding. Aeroplane, vol. 25, nos. 15 and 16, Oct. 10 and 17, 1923, pp. 361–362, 364 and 366; and 385–386, 388, 390, 392 and 394, 15 figs. Account of motorglider competition at Lympne. Utility of motor gliders; multi-cylinder power plant; drawbacks to motorgliders; low-wing monoplanes. See also article entitled Lympne Impressions, by W. H. Sayers, pp. 404 and 406–407, describing engines of competing airplanes at Lympne competition.

Performance, Estimating. Reliable Formulae for Estimating Airplane Performance and the Effects of Changes in Weight, Wing Area, or Power, Walter S. Diehl. Nat. Advisory Committee for Aeronautics—

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NOTE.—The abbreviations used in indexing are as follows:

Academy (Acad.)
American (Am.)
Associated (Assoc.)
Association (Assn.)
Bulletin (Bul.)
Bureau (Bur.)
Canadian (Can.)
Chemical or Chemistry (Chem.)
Electrical or Electric (Elec.)
Electrician (Elecn.)
Engineer[s] (Engr.[s])
Engineering (Eng.)
Gazette (Gaz.)
General (Gen.)
Geological (Geol.)
Heating (Heat.)
Industrial (Indus.)
Institute (Inst.)
Institution (Instn.)
International (Int.)
Journal (Jl.)
London (Lond.)
Machinery (Machy.)
Machinist (Mach.)
Magazine (Mag.)
Marine (Mar.)
Materials (Matls.)
Mechanical (Mech.)
Metallurgical (Met.)
Mining (Min.)
Municipal (Mun.)
National (Nat.)
New England (N. E.)
Proceedings (Proc.)
Record (Rec.)
Refrigerating (Refrig.)
Review (Rev.)
Railway (Ry.)
Scientific or Science (Sci.)
Society (Soc.)
State names (Ill., Minn., etc.)
Supplement (Supp.)
Transactions (Trans.)
United States (U. S.)
Ventilating (Vent.)
Western (West.)

Classified List of Mechanical Equipment

Manufactured by Firms Represented in MECHANICAL ENGINEERING

FOR ALPHABETICAL LIST OF ADVERTISERS, SEE PAGE 168

Accumulators, Hydraulic
Farrel Foundry & Machine Co.
Mackintosh-Hemphill Co.
* Worthington Pump & Mchry. Corp'n

Aftercoolers, Air
* Ingersoll-Rand Co.

Air Compressors, Receivers, etc.
(See Compressors, Receivers, etc., Air)

Air Conditioning Apparatus
* American Blower Co.
* Atmospheric Conditioning Corp'n
* Carrier Engineering Corp'n
* Clarage Fan Co.
* Sturtevant, B. F. Co.

Air-Jet Lifts
* Schutte & Koerting Co.

Air Washers
* American Blower Co.
* Atmospheric Conditioning Corp'n
* Carrier Engineering Corp'n
* Clarage Fan Co.
* Cooling Tower Co. (Inc.)
* Spray Engineering Co.
* Sturtevant, B. F. Co.

Alloys (Calite)
Calorizing Co.

Ammeters
* Bristol Co.
* General Electric Co.
* Westinghouse Electric & Mfg. Co.
Weston Electrical Instrument Co.

Anemometers
* Taylor Instrument Cos.
Weber, F. Co. (Inc.)

Annealing
* American Metal Treatment Co.

Arches, Boiler Furnace
* Liptak Fire-Brick Arch Co.
* McLeod & Henry Co.
* Titusville Iron Works Co.

Arches, Fire Door
* McLeod & Henry Co.

Arches, Ignition (Flat Suspended)
* Combustion Engineering Corp'n
* Liptak Fire-Brick Arch Co.
* McLeod & Henry Co.

Asbestos Products
Carey, Philip Co.
Johns-Manville (Inc.)

Autoclaves
Farrel Foundry & Machiue Co.

Axles, Car
* Fuller-Lehigh Co.

Babbitt Metal
* Medart Co.
* Westinghouse Electric & Mfg. Co.

Balancing Machines, Dynamic
*Olsen, Tinius Testing Machine Co.

Ball Bearings, Gages, etc.
(See Bearings, Gages, Ball)

Balls, Brass and Bronze
* Gwilliam Co.

Balls, Steel
* Atlas Ball Co.
* Gwilliam Co.
* New Departure Mfg. Co.
* S K F Industries (Inc.)

Barometers
* American Schaeffer & Budenberg Corp'n
* Taylor Instrument Cos.

Barometers, Mercurial
* Tagliabue, C. J. Mfg. Co.

Bearings, Ball
Fafnir Bearing Co.
Gurney Ball Bearing Co.
* Gwilliam Co.
* New Departure Mfg. Co.
* Norma Co. of America
* S K F Industries (Inc.)
* U. S. Ball Bearing Mfg. Co.

Bearings, Radial Thrust
* New Departure Mfg. Co.

Bearing, Roller
* Gwilliam Co.
* Hyatt Roller Bearing Co.
* Norma Co. of America
* Royersford Fdry. & Mach. Co.
* Timken Roller Bearing Co.

Bearings, Self-Oiling
* Brown, A. & F. Co.
* Doehler Die-Casting Co.
* Falls Clutch & Machinery Co.
* Jones, W. A. Fdry. & Mach. Co.
Link-Belt Co.
* Royersford Fdry. & Mach. Co.
* Wood's, T. B. Sons Co.

Bearings, Thrust
Fafnir Bearing Co.
* General Electric Co.
* Gwilliam Co.
* Norma Co. of America
* S K F Industries (Inc.)
* Timken Roller Bearing Co.
* U. S. Ball Bearing Mfg. Co.

Belt Dressing
* Dixon, Joseph Crucible Co.

Belt Fasteners
Flexible Steel Lacing Co.

Belt Lacing (Hinge)
Flexible Steel Lacing Co.

Belt Lacing, Steel
* Bristol Co.

Belt Tighteners
* Brown, A. & F. Co
* Jones, W. A. Fdry. & Mach. Co.
Link-Belt Co.
* Medart Co.
* Smidth, F. L. & Co.
* Wood's, T. B. Sons Co.

Belting, Canvas (Stitched)
* United States Rubber Co.

Belting, Conveyor
* Goodrich, B. F. Rubber Co.
* United States Rubber Co.

Belting, Elevator
* Goodrich, B. F. Rubber Co.
* United States Rubber Co.

Belting, Leather
American Sole & Belting Leather Tanners (Inc.)

Belting, Rubber
* Goodrich, B. F. Rubber Co.
* United States Rubber Co.

Benches, Work
Manufacturing Equip. & Engrg. Co.

Bending & Straightening Machines
* Long & Allstatter Co.

Bends, Pipe
* Frick Co. (Inc.)
* Vogt, Henry Machine Co.

Billets, Steel
* Timken Roller Bearing Co.

Bleaching Machinery
Philadelphia Drying Mchry. Co.

Blocks, Tackle
Clyde Iron Works Sales Co.
* Roebling's, John A. Sons Co.

Blowers, Centrifugal
* American Blower Co.
* Clarage Fan Co.
* De Laval Steam Turbine Co.
* General Electric Co.
* Ingersoll-Rand Co.
* Kerr Turbine Co.
* Sturtevant, B. F. Co.
* Westinghouse Electric & Mfg. Co.

Blowers, Fan
* American Blower Co.
* Clarage Fan Co.
* Green Fuel Economizer Co.
* Sturtevant, B. F. Co.

Blowers, Forge
* Sturtevant, B. F. Co.

Blowers, Pressure
* American Blower Co.
* Clarage Fan Co.
Lammert & Mann Co.
* Sturtevant, B. F. Co.

Blowers, Rotary
Fletcher Works
Lammert & Mann Co.
* Schutte & Koerting Co.
* Sturtevant, B. F. Co.

Blowers, Soot
Diamond Power Specialty Corp'n
* Sturtevant, B. F. Co.

Blowers, Steam Jet
* Schutte & Koerting Co.

Blowers, Turbine
* Sturtevant, B. F. Co.

Blueing (Metal)
* American Metal Treatment Co.

Boards, Drawing
Dietzgen, Eugene Co.
Keuffel & Esser Co.
ParVell Laboratories
Weber, F. Co. (Inc.)

Boiler Baffles
* King Refractories Co. (Inc.)
* McLeod & Henry Co.

Boiler Compounds
* Dixon, Joseph Crucible Co.
Unisol Mfg. Co.

Boiler Coverings, Furnaces, Tube Cleaners, etc.
(See Coverings, Furnaces, Tube Cleaners, etc., Boiler)

Boiler Fronts
* Brownell Co.
* O'Brien, John Boiler Works Co.
* Titusville Iron Works Co.

Boiler Settings, Steel Cased
* Brownell Co.
* Casey-Hedges Co.
* McLeod & Henry Co.
* O'Brien, John Boiler Works Co.
* Vogt, Henry Machine Co.
* Walsh & Weidner Boiler Co.

Boilers, Heating
* Brownell Co.
* Casey-Hedges Co.
* Erie City Iron Works
Herbert Boiler Co.
* Keeler, E. Co.
* Leffel, James & Co.
Lidgerwood Mfg. Co.
* O'Brien, John Boiler Works Co.
* Titusville Iron Works Co.
* Union Iron Works
* Walsh & Weidner Boiler Co.

Boilers, Locomotive
* Ames Iron Works
* Brownell Co.
* Casey-Hedges Co.
* Frost Mfg. Co.
* Keeler, E. Co.
* Leffel, James & Co.
* Titusville Iron Works Co.
* Union Iron Works
* Walsh & Weidner Boiler Co.

Boilers, Marine (Scotch)
* Brownell Co.
* Casey-Hedges Co.
* Leffel, James & Co.
* Titusville Iron Works Co.
* Walsh & Weidner Boiler Co.

Boilers, Marine (Water Tube)
* Babcock & Wilcox Co.
* Casey-Hedges Co.
* Connelly, D. Boiler Co.
* O'Brien, John Boiler Works Co.
* Springfield Boiler Co.
* Titusville Iron Works Co.
* Walsh & Weidner Boiler Co.
* Ward, Charles Engineering Wks.

Boilers, Portable
* Ames Iron Works
* Brownell Co.
* Casey-Hedges Co.
* Erie City Iron Works
* Frick Co. (Inc.)
Herbert Boiler Co.
* Keeler, E. Co.
* Leffel, James & Co.
Lidgerwood Mfg. Co.
* O'Brien, John Boiler Works Co.
* Titusville Iron Works Co.
* Union Iron Works
* Walsh & Weidner Boiler Co.

Boilers, Tubular (Horizontal Return)
* Ames Iron Works
* Bigelow Co.
* Brownell Co.
* Casey-Hedges Co.
* Cole, R. D. Mfg. Co.
* Connelly, D. Boiler Co.
* Erie City Iron Works
* Frost Mfg. Co.
Herbert Boiler Co.
* Keeler, E. Co.
* Leffel, James & Co.
Lidgerwood Mfg. Co.
Morrison Boiler Co.
* O'Brien, John Boiler Works Co.
* Titusville Iron Works Co.
* Union Iron Works
* Vogt, Henry Machine Co.
* Walsh & Weidner Boiler Co.
* Ward, Charles Engineering Wks.
* Webster, Howard J.
* Wickes Boiler Co.

Boilers, Tubular (Vertical Fire)
* Ames Iron Works
* Bigelow Co.
* Brownell Co.
* Casey-Hedges Co.
Clyde Iron Works Sales Co.
* Frost Mfg. Co.
* Keeler, E. Co.
* Leffel, James & Co.
Lidgerwood Mfg. Co.
Morrison Boiler Co.
* O'Brien, John Boiler Works Co.
* Titusville Iron Works Co.
* Union Iron Works
* Walsh & Weidner Boiler Co.

Boilers, Water Tube (Horizontal)
* Babcock & Wilcox Co.
* Casey-Hedges Co.
* Cole, R. D. Mfg. Co.
* Connelly, D. Boiler Co.
* Edge Moor Iron Co.
* Erie City Iron Works
* Frost Mfg. Co.
Herbert Boiler Co.
* Keeler, E. Co.
* Ladd, George T. Co.
Morrison Boiler Co.
* O'Brien, John Boiler Works Co.
* Springfield Boiler Co.
* Union Iron Works
* Vogt, Henry Machine Co.
* Walsh & Weidner Boiler Co.
* Wickes Boiler Co.

Boilers, Water Tube (Inclined)
* Babcock & Wilcox Co.
* Bigelow Co.
* Casey-Hedges Co.
* Keeler, E. Co.
* Ladd, George T. Co.
Morrison Boiler Co.
* O'Brien, John Boiler Works Co.
* Vogt, Henry Machine Co.
* Walsh & Weidner Boiler Co.
* Ward, Charles Engineering Wks.

Boilers, Water Tube (Vertical)
* Babcock & Wilcox Co.
* Bigelow Co.
* Casey-Hedges Co.
* Erie City Iron Works
* Keeler, E. Co.
* Ladd, George T. Co.
Morrison Boiler Co.
* O'Brien, John Boiler Works Co.
* Walsh & Weidner Boiler Co
* Wickes Boiler Co.

Brake Blocks
Johns-Manville (Inc.)

Brakes, Air
* Allis-Chalmers Mfg. Co.
* General Electric Co.

Brass Goods
* Scovill Mfg. Co.

Brass Mill Machinery
Farrel Foundry & Machine Co.

Breechings, Smoke
* Brownell Co.
Morrison Boiler Co.
* Titusville Iron Works Co.
* Vogt, Henry Machine Co.

Brick, Fire
* Bernitz Furnace Appliance Co.
* Celite Products Co.
* Drake Non-Clinkering Furnace Block Co.
Keystone Refractories Co.
* King Refractories Co. (Inc.)
* McLeod & Henry Co.

Brick Insulating
* Celite Products Co.
* Quigley Furnace Specialties Co.

Bridges, Coal & Ore Handling
* Brown Hoisting Machinery Co.
Link-Belt Co.

Bridgewalls (Furnace)
* McLeod & Henry Co.

Buckets, Elevator
* Brown Hoisting Machinery Co.
Chain Belt Co.
* Gifford-Wood Co.
* Hendrick Mfg. Co.
* Jones, W. A. Fdry. & Mach. Co.
Link-Belt Co.

Buckets, Grab
* Brown Hoisting Machinery Co.
Clyde Iron Works Sales Co.
Lidgerwood Mfg. Co.
Link-Belt Co.

*Catalogue data of firms marked * appear in the A.S.M.E. Condensed Catalogues of Mechanical Equipment, 1923-24 Volume*

Report, no. 173, 1923, 22 pp., 10 figs. Contains derivation and verification of formulas for predicting speed-range ratio, initial rate of climb, and absolute ceiling of airplane.

Seaplanes. See SEAPLANES

Speed Calculation. Graphic Method for Calculating the Speed and Climbing Ability of Airplanes, Adolf Rohrbach and Edwin Lupbe ger. Nat. Advisory Committee for Aeronautics—Tech. Notes, no. 163, Oct. 1923, 10 pp., 4 figs. Method by means of which, starting from actual power developed by engine, it is possible to determine all factors which together constitute what are known as flight performances for any combination of engine and airplane, from single graphic diagram given herewith.

Training and Sport. The Training Airplane Mark R IV/23 (Das Schulflugzeug Mark R IV/23), C. W. Erich Meyer. Motorwagen, vol. 26, no. 25, Sept. 10, 1923, pp. 381–382, 4 figs. Describes light 2-seater training, sport and travel airplane equipped with 50-hp. engine.

ALLOYS

Aluminum. See ALUMINUM ALLOYS.

Brass. See BRASS.

Contraction. High Shrinkage Alloys. Brass World, vol. 19, no. 10, Oct. 1923, pp. 341–343. Results of investigation to determine linear contraction of a series of brass and bronze alloys used generally in foundry work. Abstract of paper by R. J. Anderson and E. J. Fahlman.

Modifications of the Law of Volumetric Shape and Contraction of Metals and Alloys (Ueber die Gesetzmässigkeiten der Volumengestaltung und Schwindung von Metallen und Legierungen), F. Sauerwald. Giesserei-Zeitung, vol. 20, no. 20, Sept. 15, 1923, pp. 391–393, 5 figs. Deals with binary alloys in liquid and solid state and during interval of solidification.

Copper-Zinc. Cold Rolling and Annealing of Some Copper-Zinc Alloys, Pendleton Powell. Brass World, vol. 19, nos. 9 and 10, Sept. and Oct., 1923, pp. 281–284 and 335–338, 42 figs. Results of experiments on influence of cold rolling upon annealed alloys and influence of heat treatment upon cold-rolled alloys. Abstract of report made to Technische Hoch-Schule.

Molybdenum in. Molybdenum as an Alloy Component (Molybdän als Legierungsbestandteil), W. Guertler. Zeit. für Metallkunde, vol. 15, nos. 6 and 9, June and Sept. 1923, pp. 151–154 and 251–256, 17 figs. For alloys with molybdenum as main component, following additions can be used: carbon, silicon, titanium, zirconium, tungsten, tantalum and metals of the iron group which melt at high temperature, including vanadium; as addition molybdenum can be used only for such alloys in which iron, cobalt and nickel, or tungsten, tantalum and palladium constitute the main component.

ALUMINUM ALLOYS

Duralumin. See DURALUMIN.

Uses. The Use of Non-Ferrous Alloys in Place of Iron and Steel, John L. Haughton. Beama, vol. 13, no. 67, Nov. 1923, pp. 293–297, 2 figs. Consideration of aluminum alloys.

Working Qualities. The Workability of Aluminum-Casting Alloys with Special Regard to Silumin (Bearbeitbarkeit von Aluminiumgusslegierungen unter besonderer Berücksichtigung von Silumin), G. Welter. Werkstattstechnik, vol. 17, no. 18, Sept. 15, 1923, pp. 545–549, 7 figs. Results of tests with German and American alloys, and with silumin; behavior of different alloys in case of sawing, turning, milling, drilling, or thread-cutting; influence of lubrication.

AMMONIA CONDENSERS

Design. Ammonia Condenser Design, Oscar A. Anderson. Refrig. Eng., vol. 10, no. 4, Oct. 1923, pp. 115–117 and (dicsussion) 117 and 119–120. Characteristics of different types of condensers.

ARTILLERY

Design. Artillery Design, G. L'H. Ruggles. Army Ordnance, vol. 3, nos. 19 and 20, July-Aug. and Sept.-Oct. 1923, pp. 15–22 and 101–110, 11 figs. Requirements of Caliber Board and progress in artillery development thereunder; advantages and disadvantages of requirements, etc.

AUTOMOBILE ENGINES

Ignition. See IGNITION.

Radiator Core. New Radiator Core Has Aluminum Fins. Automotive Industries, vol. 49, no. 19, Nov. 8, 1923, p. 945, 2 figs. New form in which indirect radiating surface is of aluminum instead of constructional copper, developed by Stolp Co.

AUTOMOBILE MANUFACTURING PLANTS

Citroen Shops, France. Citroën Automobile Shops in France, Godfrey L. Carden. Iron Age, vol. 112, no. 20, Nov. 15, 1923, pp. 1310–1312, 5 figs. Equipment and methods.

Ford River Rouge Plant. Some Engineering Features of the Ford Plant at River Rouge, L. B. Breedlove. West. Soc. Engrs.—Jl., vol. 28, no. 10, Oct. 1923, pp. 472–484, 1 fig. Material-receiving facilities; new method of cleaning gas developed; coke-plant operation; conveyors for coal and coke handling; turbine power plant; utilization of blast-furnace gas; design of boilers; use of pulverized coal; foundry production system; cupola buildings; etc.

AUTOMOBILES

A. C. The Royal A. C. 16 Hp. Six-Cylinder Car. Auto-Motor Jl., vol. 28, no. 39, Sept. 27, 1923, pp. 811–814, 11 figs. Particulars of latest models of successful light six.

Accessories. The Olympia Motor Show, 1923. Accessories at the Show. Auto-Motor Jl., vol. 28, no. 43, Oct. 25, 1923, pp. 893–906, 54 figs. Brief descriptions of exhibits, arranged alphabetically according to exhibitors.

Aster. The 1924 Aster. Autocar, vol. 51, no. 1462, Oct. 26, 1923, pp. 749–750, 5 figs. Data on design, engine, ignition arrangements, and rear axle casing; 4-wheel brakes and optional magneto features of 6-cylinder chassis.

Bean. The New Bean Fourteen. Autocar, vol. 51, no. 1461, Oct. 19, 1923, pp. 695–698, 9 figs. Four-wheel brakes, four-speed gear box, wide track and capacious coachwork, form main features of car.

Berliet. The 15.9 Hp. Berliet Car. Auto-Motor Jl., vol. 28, no. 36, Sept. 6, 1923, pp. 749–652, 12 figs. To be had with standard French body or with special English finished body; monobloc 4-cylinder engine.

Bodies. Parisian Coachwork. Autocar, vol. 51, no. 1460, Oct. 12, 1923, pp. 639–642, 15 figs. Great advance in favor of fabric-covered saloon as substitute for wooden or metal panels and roofs.

Bodies, Specifications. Standard Specifications in Wood-Working, Roger Manning. Wood Worker, vol. 42, no. 8, Oct. 1923, pp. 56–68, 1 fig. How specification and direction of information covering every phase of woodworking is handled in one automobile body plant.

Brakes. Some Notes on Brake Design and Construction, H. M. Crane. Soc. Automotive Engrs.—Jl., vol. 13, no. 5, Nov. 1923, pp. 395–398, 1 fig. Braking functions; desirable features of brake design; power available for operating brake; brake-operating mechanisms; design and construction of brake mechanism; types of brake drum and band or shoe design; brake materials

The Four-Wheel Brake Question. Autocar, vol. 51, no. 1461, Oct. 19, 1923, pp. 701–703. Views of section of manufacturers who prefer to continue experiments before adopting them.

British Show. Front-Wheel Brakes Are Chief Features of British Show, M. W. Bourdon. Automotive Industries, vol. 49, no. 19, Nov. 8, 1923, pp. 932–939, 7 figs. Marked improvement noted in closed bodies; description of exhibits.

Buick. Two New Buick Models. Auto-Motor Jl., vol. 28, no. 36, Sept. 6, 1923, pp. 755–756, 2 figs. Describes new six-cylindered model, with four-wheel braking, and new four.

Cleveland. The Cleveland Six. Auto-Motor Jl., vol. 28, no. 40, Oct. 4, 1923, pp. 831–834, 9 figs. Details of design and construction; 45-hp. engine, having detachable head and overhead valves.

Cluley. The 15.7 Hp. Cluley Six. Autocar, vol. 51, no. 1460, Oct. 12, 1923, p. 643, 2 figs. Six-cylinder car with four-speed gear box and very complete equipment.

German Show. German Show Is Largest Ever Held Despite Economic Troubles, Benno R. Dierfeld. Automotive Industries, vol. 49, no. 16, Oct. 18, 1923, pp. 774–778, 13 figs. Large number of new small cars feature exhibition; 80 makers show 130 different models; four cars have aluminum engines.

Headlights. The Deglarescope, William S. Franklin and Elof Benson. Tech. Eng. News, vol. 4, no. 4, Oct. 1923, pp. 128 and 154, 4 figs. Describes headlight developed by Prof. Wm. J. Dirsko and sets forth great increase of compatibility of its anti-glare and light-distributing functions.

Lanchester. A New 21 Hp. Lanchester. Autocar, vol. 51, no. 1459, Oct. 5, 1923, pp. 601–605, 8 figs. Four-wheel brakes, 4-speed gear box and 6-cylinder engine with overhead valve gear; details of design and construction.

Mathis. The Six-Cylinder Mathis. Auto-Motor Jl., vol. 28, no. 42, Oct. 18, 1923, pp. 871–874, 13 figs. New French model with 4-wheel braking.

Maudslay. A Six-Cylinder Maudslay. Autocar, vol. 51, no. 1461, Oct. 19, 1923, pp. 676b–678b, 8 figs. Highly developed touring car, with crankshaft, camshaft, and big ends on roller bearings, and new form of drive for two overhead camshafts; other features are 4-speed center bearing gear box, single-unit direct-driven starter and dynamo inside crankcase, and no spring shackles.

Napier. The 40–50 Hp. Napier Car. Auto-Motor Jl., vol. 28, no. 41, Oct. 11, 1923, pp. 851–854, 10 figs. Monobloc six-cylinder engine; details of design and constructions.

Paris Show. Notable Designs at Paris. Autocar, vol. 51, no. 1460, Oct. 12, 1923, pp. 633–636, 12 figs. Review of well-known chassis.

Rhode. The 9.5 H. P. Rhode Chassis. Automobile Engr., vol. 13, no. 181, Oct. 1923, pp. 290–297, 14 figs. Details of low-priced car with overhead-valve engine.

Rover. The 3½-Litre Rover Six. Autocar, vol. 51, no. 1461, Oct. 19, 1923, pp. 687–690, 6 figs. Larger and entirely new car with 4-wheel brakes added to 1924 range.

Ruston-Hornsby. The 16 Hp. and 20 Hp. Ruston-Hornsby Chassis. Automobile Engr., vol. 13, no. 182, Nov. 1923, pp. 322–328, 15 figs. Details of cars which are claimed to be typical examples of British design, giving considerable attention to requirements and convenience of driver.

Singer. Singer Cars for 1924. Autocar, vol. 51, no. 1462, Oct. 26, 1923, pp. 747–748, 6 figs. Modifications of 10-hp. model; 15-hp. six-cylinder car unaltered; wide range of coachwork available.

Star. New Star, Selling for $490, Leaves Ford Price Class. Automotive Industries, vol. 49, no. 19, Nov. 8, 1923, pp. 942–945, 9 figs. Improvements made in chassis and body construction; brake-rod layout changed.

Steering Linkage. The Automobile Steering Linkage, P. Cormack. Lond., Edinburgh, & Dublin Philosophical Mag. & Jl. Sci., vol. 46, no. 274, Oct. 1923, pp. 665–671, 4 figs. The concurrent equation; property of quadrilateral; approximate equation for design of quadrilateral; graphical solution of design problem.

Sterling. Sterling Now in Production on New Chassis with Four Body Models. Automotive Industries, vol. 49, no. 17, Oct. 25, 1923, pp. 840–841, 3 figs. Rubber shock insulators used at both ends of all springs; pressure lubrication to all crankshaft bearings and piston pins.

Sunbeam. The New 20 Hp. Sunbeam Six. Autocar, vol. 51, no. 1459, Oct. 5, 1923, pp. 607–608, 5 figs. Details of design and construction; overhead valve engine, 4-speed gear box, and 4-wheel brakes.

Two New Sunbeam Cars. Autocar, vol. 51, no. 1462, Oct. 26, 1923, pp. 745–746, 6 figs. Notes on six-cylinder 16–50-hp., and four-cylinder 12–30-hp. cars.

Tire-Rim Manufacture. Automobile Rims Made in Thirty Minutes, F. L. Prentiss. Iron Age, vol. 112, no. 19, Nov. 8, 1923, pp. 1233–1236, 6 figs. Rapid movement of material from raw stock pile to finished product in cars in new plant of Firestone Steel Products Co.

Transmissions. New Sliding Change Speed Gearsets Announced in Europe. Automotive Industries, vol. 49, no. 17, Oct. 25, 1923, pp. 830–833, 6 figs. Lavaud automatic transmission brought out in France; Constantinesco torque converter developed in England.

Revolutionary Transmission. Autocar, vol. 51, no. 1460, Oct. 12, 1923, pp. 647–650, 10 figs. Three modern mechanisms which may greatly influence automobile practice, namely, the De Lavaud system; Healey variable-speed gear box; and Constantinesco variable gear.

Variable Transmission, G. Constantinesco. Automobile Engr., vol. 13, no. 182, Nov. 1923; pp. 332–335, 2 figs. Deals with transmission gear developed by author, which he calls converter, as viewed from automobile standpoint, and compares its behavior with previous attempts to solve problem of transmission for automobiles.

Windsor. The 10.4 Hp. Windsor. Autocar, vol. 51, no. 1461, Oct. 19, 1923, pp. 685–686, 3 figs. New small car with 4-wheel brakes.

AVIATION

Aerial Transportation. The Development of Airship Transport. Aeroplane, vol. 25, no. 11, Sept. 12, 1923, pp. 273–274. Points out that the smaller and slower types of airship have distinct commercial possibilities; transport and development.

Transporting Ore by Airplane, Adrian Van Muffling. Eng. & Min. Jl.-Press, vol. 116, no. 19, Nov. 10, 1923, pp. 797–802, 5 figs. Problem of substituting airplanes for present means of transportation in carrying ore from outlying mines situated far from a railway. Factors to be considered in making analysis of given locality and in preparing a financial estimate, including landing fields, character of ore, flying equipment, etc.

Night-Flying Mail Service. Review of the Air Mail Night Flying Trials, Paul Henderson. Aviation, vol. 15, no. 17, Oct. 22, 1923, pp. 521–523. Thirty-day test recommended as basis of new coast-to-coast service; night-flying ships; attitude pilots; experimental operation.

AXLES

Automobile, Swaging. Swaging Automobile Axles, John Williams. Am. Mach., vol. 59, no. 20, Nov. 15, 1923, p. 732, 3 figs. Application of process of swaging to making of axles whereby several turning operations are eliminated and saving of stock effected.

B

BALANCING

Weights, Dimensions of. The Dimensions of Balance Weights. Mach. (Lond.), vol. 23, no. 577, Oct. 18, 1923, pp. 72–73, 3 figs. Consideration of dimensions of weights required to balance equivalent unbalanced mass at crankpin.

BALANCING MACHINES

Lawaczeck-Heymann. The Balancing of Rotating Machine Parts (Das Auswuchten rotierender Maschinenteile), Ernst Lehr. Fördertechnik u. Frachtverkehr, vol. 16, no. 14, July 18, 1923, pp. 160–162, 3 figs. Describes Lawaczeck-Heymann balancing machine which works on so-called double-pendulum principle.

Static-Dynamic. Some Developments in Balancing Machines, C. Norman Fletcher. Macy. (Lond.), vol. 23, no. 576, Oct. 11, 1923, pp. 52–53, 4 figs. Describes improvements made in Olsen-Carwen static-dynamic balancing machines.

BAROMETERS

Types and Use. The Meaning of Atmospheric Pressure, T. M. Gunn. Power, vol. 58, no. 21, Nov. 20, 1923, pp. 811–813, 3 figs. Types and principle of barometers for measuring atmospheric pressure, and their use; presents charts for finding barometrical pressure above sea level, and correction for latitude and temperature.

BEARINGS, BALL

Roller and. Some Developments in Ball and Roller Bearing Work, with Particular Reference to Steel Rolling Mill Plant, A. W. Macaulay. West of Scotland Iron & Steel Inst.—Jl., vol. 30, parts 5–7, Feb.-Mar.-Apr., 1923, pp. 58–68 and (discussion) 69–73, 34 figs. on supp. plates. Deals with steel used in production of ball bearings and refers to recent developments regarding their application to steel works.

Manufactured by Advertisers — CLASSIFIED LIST OF MECHANICAL EQUIPMENT — Alphabetical List on page 168

Buckets, Self-Dumping
* Brown Hoisting Machinery Co.
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* Best, W. N. Corp'n
* Combustion Engineering Corp'n
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* Quigley Furnace Specialties Co.

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* Wood's, T. B. Sons Co.

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Economy Drawing Table & Mfg. Co.
Keuffel & Esser Co.
Manufacturing Equip. & Engrg. Co.
ParVell Laboratories
Weber, F. Co. (Inc.)

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Lidgerwood Mfg. Co.

Calorimeters
* American Schaeffer & Budenberg Corp'n
* Sarco Co. (Inc.)

Calorizing
Calorizing Co.

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* Whiting Corp'n

Cars, Industrial Railway
Link-Belt Co.
* Whiting Corp'n

Cars, Trolley (Industrial Railway)
Link-Belt Co.

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* American Metal Treatment Co.

Casings, Steel (Boiler)
* Brownell Co.
* Casey-Hedges Co.
* Vogt, Henry Machine Co.
* Walsh & Weidner Boiler Co.

Castings, Acid Resistant
* U. S. Cast Iron Pipe & Fdry. Co.

Castings, Aluminum
Buffalo Bronze Die Casting Corp'n
DuPont Engineering Co.

Castings, Brass
* Croll-Reynolds Engineering Co.
Du Pont Engineering Co.
* Edward Valve & Mfg. Co.

Castings, Brass and Bronze
* Economy Pumping Machinery Co

Castings, Bronze
Buffalo Bronze Die Casting Corp'n

Castings, Die-Molded
* Doehler Die-Casting Co.
Veeder Mfg. Co.

Castings, Heavy
Farrel Foundry & Machine Co.
* U. S. Cast Iron Pipe & Fdry. Co.

Castings, Iron
* Brown, A. & F. Co.
* Builders Iron Foundry
* Burhorn, Edwin Co.
* Casey-Hedges Co.
* Central Foundry Co.
Chain Belt Co.
* Cole, R. D. Mfg. Co.
* Croll-Reynolds Engineering Co.
DuPont Engineering Co.
* Economy Pumping Machinery Co
* Falls Clutch & Machinery Co.
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* Franklin Machine Co.
* Fuller-Lehigh Co.
* Harrisburg Fdry. & Mach. Wks.
* Jones, W. A. Fdry. & Mach. Co.
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* Nordberg Mfg. Co.
* Pittsburgh Valve, Fdry. & Const. Co.
* Royersford Fdry. & Mach. Co.
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* U. S. Cast Iron Pipe & Fdry. Co.
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* Edward Valve & Mfg. Co.

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Farrel Foundry & Machine Co.
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* Vogt, Henry Machine Co.

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* Falk Corporation
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Mackintosh-Hemphill Co.
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Smooth-On Mfg. Co.

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Smooth-On Mfg. Co.

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* Fuller-Lehigh Co.
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* Smidth, F. L. & Co.
* Worthington Pump & Machinery Corp'n

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Tolhurst Machine Works

Centrifugals, Metal Drying
Tolhurst Machine Works

Centrifugals, Sugar
Fletcher Works
Tolhurst Machine Works
* Worthington Pump & Mchry. Corp'n

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Union Chain & Mfg. Co.
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Reading Chain & Block Corp'n

Chains, Crane
Reading Chain & Block Corp'n

Chains, Power Transmission
Baldwin Chain & Mfg. Co
Chain Belt Co.
* Diamond Chain & Mfg. Co.
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* Morse Chain Co.
Union Chain & Mfg. Co.
* Whitney Mfg. Co.

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* Whiting Corp'n

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Heine Chimney Co.
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Morrison Boiler Co.
Wiederholdt Construction Co.

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Heine Chimney Co.
Wiederholdt Construction Co.

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Chain Belt Co.
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* American Machine & Foundry Co.

Cigarette Making Machinery
* American Machine & Foundry Co.

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* General Electric Co.

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* Schutte & Koerting Co.

Circulators, Steam Heating
* Schutte & Koerting Co.

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* Goodrich, B. F. Rubber Co.

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* Western Engineering & Mfg. Co.
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Coal Bins
* Brown Hoisting Machinery Co.
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Coal Breakers and Cleaners
Pennsylvania Crusher Co.

Coal Mine Equipment and Supplies
* General Electric Co.

Coal Mining Machinery
* General Electric Co.
* Ingersoll-Rand Co.

Coaling Stations, Locomotive
Chain Belt Co.
* Gifford-Wood Co.
Link-Belt Co.

Coating (Metal Protecting)
* American Machine & Foundry Co.

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* American Schaeffer & Budenberg Corp'n
* Ashton Valve Co.
* Crane Co.
* Jenkins Bros.
Lunkenheimer Co.
* Reading Steel Casting Co. (Inc.) (Pratt & Cady Division)
* Vogt, Henry Machine Co.

Cocks, Blow-off
* Crane Co.
Lunkenheimer Co.
* Pittsburgh Valve, Fdry. & Const. Co.
* Reading Steel Casting Co. (Inc.) (Pratt & Cady Division)

Cocks, Three-Way and Four-Way
* American Schaeffer & Budenberg Corp'n
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* Crosby Steam Gage & Valve Co.
Lunkenheimer Co.
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* Royersford Fdry. & Mach. Co.
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* American Metal Treatment Co.

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* Sarco Co. (Inc.)
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* Ingersoll-Rand Co.
Mackintosh-Hemphill Co.
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* Titusville Iron Works Co.
* Wayne Tank & Pump Co.
* Worthington Pump & Machinery Corp'n

Compressors, Air, Centrifugal
* De Laval Steam Turbine Co.
* General Electric Co.

Compressors, Air, Compound
* Ingersoll-Rand Co.
* Nordberg Mfg. Co.
* Worthington Pump & Machinery Corp'n

Compressors, Ammonia
* Frick Co. (Inc.)
* Ingersoll-Rand Co.
* Vilter Mfg. Co.
* Vogt, Henry Machine Co.
* Worthington Pump & Machinery Corp'n

Compressors, Gas
* De Laval Steam Turbine Co.
* General Electric Co.
* Ingersoll-Rand Co.
* Nordberg Mfg. Co.
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Condensation Return Systems
* Economy Pumping Machinery Co.

Condensers, Ammonia
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* Frick Co. (Inc.)
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* Ingersoll-Rand Co.
Kellogg, M. W. Co.
* U. S. Cast Iron Pipe & Fdry. Co.
* Wheeler, C. H. Mfg. Co.
* Wheeler Condenser & Engrg. Co.
* Worthington Pump & Machinery Corp'n

Condensers, Jet
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* Nordberg Mfg. Co.
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* Wheeler Condenser & Engrg. Co.
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* Nordberg Mfg. Co.
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Wilson, H. A. Co.

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* Elwell-Parker Electric Co.
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* Simplex Valve & Meter Co.

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* Davis, G. M. Regulator Co.
* General Electric Co.
* Simplex Valve & Meter Co.
* Tagliabue, C. J. Mfg. Co.

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* Whiting Corporation

Converters, Synchronous
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Link-Belt Co.

*Catalogue data of firms marked * appear in the A.S.M.E. Condensed Catalogues of Mechanical Equipment, 1923-24 Volume*

The Question of Ball and Roller Bearings in Street-Railway Operation (Zur Frage der Kugel- und Rollenlager im Strassenbahnbetrieb), H. Tobias. Verkehrstechnik, vol. 40, no. 38, Sept. 21, 1923, pp. 347–350. Results of investigations show that correctly designed ball and roller armature bearings are superior to journal bearings from viewpoint of safety in operation, saving in use of lubricating oil and in care and maintenance of motors.

BLAST-FURNACE GAS

Dry Cleaning. Filtering Dirty Gas Through Flue Dust, George B. Cramp. Iron Age, vol. 112, no. 17, Oct. 25, 1923, pp. 1111–1114, 2 figs. Dry cleaning of blast-furnace gas, based on tests at Monessen plant of Pittsburgh Steel Co.; calculation of areas required.

BOILER FEEDWATER

Air Separator. The Hickman Air Separator. Pac. Mar. Rev., vol. 20, no. 11, Nov, 1923, pp. 528–529, 2 figs. Simple device for mechanical separation of entrained air from feedwater in steam plant, practically eliminating interior corrosion.

BOILER FURNACES

Design. Furnace Design (With Special Reference to Welsh Coal Burning), David Wilson. South Wales Inst. Engrs.—Proc., vol. 38, no. 8, Sept. 26, 1923, pp. 723–738 and (discussion) 738–755, 9 figs. Function of fire grate and of combustion chamber; advantages of mechanical stokers, including saving in labor, high thermal efficiency, and large grate area.

Forced Draft. Forced Draft (Unterwind), H. Bergmann. Archiv für Wärmewirtschaft, vol. 4, no. 8, Aug. 1923, pp. 151–152, 1 fig. Describes new type of grate which is departure from all previous designs and is said to fulfill all requirements for use of forced draft.

Improvements. New Furnaces (Neue Feuerungsanlagen), H. Pradel. Feuerungstechnik, vol. 11, nos. 20 and 21, July 15 and Aug. 1, 1923, pp. 204–205 and 211–213, 9 figs. Extension furnaces for traveling grates; low-temperature tar recovery in boiler furnaces; auxiliary oil furnaces; etc.

Pulverized-Coal Plant. A New Coal Dust Fuel Plant, G. Petri. Eng. Progress, vol. 4, no. 6, June 1923, pp. 119–121, 4 figs. Describes combined coal-dust fuel and chain-grate plant, main object of which is economical combustion of fuels which are difficult to ignite; principal fields of application.

Steam-Jet. The Modern Steam-Jet Furnace. Gas Jl., vol. 163, no. 3149, Sept. 19, 1923, pp. 870–872, 5 figs. Scientific principles involved in design of an efficient forced-draft steam-jet furnace, as exemplified by latest developments in "turbine furnace."

Temperature Control. New Apparatus Successfully Controls Temperature. Fuels & Furnaces, vol. 1, no. 6, Oct. 1923, pp. 437–439, 4 figs. Describes automatic control devised by H. G. Geissinger, of Detroit, Mich., for fuel-fired furnaces; electricity used as motive force, and safety against overheating is assured if power supply fails.

BOILER PLANTS

Efficiency, Increasing. Prospects for Increasing the Efficiency of Boiler Plants (Die Leistungserhöhung der Dampfkesselanlagen und ihre Aussichten), August Loschge. Zeit. des Bayerischen Revisions-Vereins, vol. 27, nos. 15, 16 and 17, Aug. 15, 31 and Sept. 15, 1923, pp. 113–115, 121–123 and 130–132, 15 figs. Methods of enlarging or strengthening boiler plants and difficulties involved; other methods of increasing efficiency, such as alterations in superstructure, use of maximum-pressure boilers and utilization of heat-accumulator effect.

Efficiency Meter. The Gilson Efficiency Meter. Engineering, vol. 116, no. 3018, Nov. 2, 1923, pp. 558–559, 4 figs. Device for indicating continuously number of pounds of coal being burnt per kw-hr. in power station.

Problems. Power Problems of Vital Interest to Executives, James T. Beard, 2nd. Indus. Management (N. Y.), vol. 66, no. 5, Nov. 1923, pp. 302–307, 5 figs. Maintenance and repairs.

Steam-Production Costs Reduction. How Steam Production Costs Were Reduced in a Hand-Fired Return-Tubular Boiler Plant, A. R. Mumford. Southern Engr., vol. 40, no. 3, Nov. 1923, pp. 38–42, 1 fig. Original fuel cost to produce 1000 lb. steam was $0.5287; simple changes reduced this cost to $0.354 per 1000 lb. of steam, a saving of over 30 per cent in fuel cost.

BOILERMAKING

Durr Works, Germany. The Durr Boiler Works at Ratingen, Germany, Godfrey L. Carden. Boiler Maker, vol. 23, no. 10, Oct. 1923, pp. 273–276, 4 figs. Explains status of boiler design and construction in one of the largest shops in Europe devoted to boiler work and outlines tendency in design toward higher pressures and changes in types.

BOILERS

Gas-Fired. Town-Gas Fired Boilers. Gas Jl. (Supp.), vol. 163, no. 3150, Sept. 26, 1923, pp. 164–166, 3 figs. Describes Spencer-Bonecourt systems, with automatic action; comparison of costs and results obtained of solid fuel and town gas for boilers.

Heat-Storage Problems. The Heat Storage Problem with Special Regard to Elastic Efficiency of Boilers (Das Wärmespeicherproblem unter besonderer Berücksichtigung der Leistungselastizität von Dampfkesseln), Robert Jurenka and H. E. Witz. Archiv für Wärmewirtschaft, vol. 4, no. 1, Oct. 1923, pp. 187–192, 17 figs. Under elastic efficiency is meant fluctuations which a boiler can sustain without noticeably affecting its efficiency; greatest possible elastic efficiency is obtained by use of hot-water storage, and combining hot-water and steam accumulators.

Inspection. Boiler Inspection. Textile World, vol. 64, no. 9 and 14, Sept. 1 and Oct. 6, 1923, pp. 82, 85 and 87, 89–90 and 93, 1 fig. Preparation for inspection, points covered by inspectors, internal inspection; troubles and defects to be looked for and means of avoiding or overcoming them.

Repairing. Boiler Repair Methods at Columbus Shops. Boiler Maker, vol. 23, no. 6, June 1923, pp. 151–154 and 183, 7 figs. Details of plant of Pennsylvania Railroad at Columbus, Ohio, and some of the work done.

Waste-Heat. Why Not Harness the Engine Exhaust. L. H. Morrison. Power, vol. 58, no. 20, Nov. 13, 1923, pp. 765–767, 4 figs. Value of heat now wasted in exhaust of internal-combustion engines is pointed out, and types of waste-heat boilers in use and installation costs are outlined.

BOILERS, WATER-TUBE

Developments. Water-Tube Boiler and Crane Construction, James H. R. Kemnal. Instn. Mech. Engrs.—Proc., no. 4, June 1923, pp. 579–594 and (discussion) 594–608, 9 figs. History of development of water-tube boilers; air heaters vs. economizers. Description of electric jib crane fitted with luffing gear, and its use for luffing of jibs, shears and boats' davits.

Edge Moor Single-Pass. Edge Moor Single-Pass Boiler. Power, vol. 58, no. 20, Nov. 13, 1923, p. 769, 2 figs. New Type of water-tube boiler embodying some new features.

BRASS

Constitution. The Constitution of Brass (Zur Konstitution des Messings), Georg Masing. Wissenschaftliche Veröffentlichungen aus dem Siemens-Konzern, vol. 3, no. 1, May 15, 1923, pp. 240–242, 3 figs. It is shown that beta-crystals under 470 deg. (cent.) develop in brass through diffusion and therefore contrary to prevailing assumption, are likewise constant in lower temperatures.

BUSES

Trolley. An English Front-Drive Trolley Bus. Bus Transportation, vol. 2, no. 4, Apr. 1923, pp. 181–182, 2 figs. Describes double-deck vehicle evolved by Trackless Cars Ltd., Leeds, England, having seating capacity of 64; stairway to upper deck inside; design incorporates provision for easy riding qualities.

Birmingham's Experiment With Trolley Omnibuses, A. Baker. Elec. Ry. & Tramway Jl., vol. 49, no. 1202, Sept. 14, 1923, pp. 131–135 and (discussion) 135–142, 3 figs. Explains reasons which led Birmingham Corporation to pull up one of its tramways and substitute another system in its place; company's experience with new trolley-bus system. Concludes that for transport of large masses of people expeditiously and cheaply, tramcar has no competitor and still holds the field. Paper read before Mun. Tramways Assn.

C

CABLEWAYS

Curve Guides. Automatic Curve-Guide for Rope Haulage Plant, G. Ryba. Indus. Management (Lond.), vol. 10, no. 8, Oct. 18, 1923, pp. 229–230, 2 figs. Describes self-acting guides designed by A. Krahl, chief surveyor of Himmelfürst Pit, Hammer (Czecho-Slovakia), with which arrangement it is stated that tubs run easily round curves, jockeys do not require such accurate adjustment, tubs can be loaded above level of body, there is no lateral tension on rope, and latter cannot slip off guides. From Montanische Rundschau.

Electric Suspension. An Improvement in Suspension Railways (Eine Neuerung im Hängebahnwesen), G. A. Geipel. Fördertechnik u. Frachtverkehr, vol. 16, no. 15, Aug. 3, 1923, pp. 169–170, 6 figs. Describes so-called fixed-tongue switch and points out its advantages; control of driver's stand crab, of front and rear car; construction data for fixed-tongue crab.

Pipe Conveying and Laying. Ropeway Installation for Conveying and Laying Hydraulic Power Mains. Indus. Management (Lond.), vol. 10, no. 8, Oct. 18, 1923, pp. 223–225, 3 figs. Describes ropeway used to convey and lay pipes for power mains from Hone to Bard, a district near Turin, for an extensive hydroelectric installation built for Societa Idroeletrica of Villeneuve and Borgo-Franco, Turin; total length of line 1800 m. From Ingegneria, Aug. 1, 1923.

CAR DUMPERS

Type. Gantry Wagon Tips for Yards, River and Sea Ports, E. Krahnen. Indus. Management (Lond.), vol. 10, no. 9, Nov. 1, 1923, pp. 251–253, 7 figs. New type of car dumper built for harbor of Hanover by German Machine Works (DEMAG), Duisburg.

Railway, Semi-Automatic. Semi-Automatic Railroad Car Dumper. Iron Age, vol. 112, no. 20, Nov. 15, 1923, pp. 1324–1326, 3 figs. All motions except revolving are automatic; car held by clamps rigidly against blocking; only one motor.

CAR WHEELS

Rolled Steel. The Manufacture of Rolled Steel Wheels, G. A. Richardson. St. Louis Ry. Club—Proc., vol. 28, no. 3, July 13, 1923, pp. 60–63. It is shown how standardization has immeasurably simplified problems of buying and selling.

CARBURETORS

Claudel-Hobson. The Claudel-Hobson Power Jet Carburetor. Auto-Motor Jl., vol. 28, no. 41, Oct. 11, 1923, p. 858, 1 fig. New carburetor which gives extra power by an auxiliary jet at full throttle.

CARS

Wheel, Gear and Axle Practice. Wheel, Gear and Axle Practice. Elec. Ry. Jl., vol. 62, nos. 7 and 17, Aug. 18 and Oct. 27, 1923, pp. 245–250 and 729–736, 25 figs. Findings resulting from survey of 60 electric railways; mileage obtained and costs resulting from operation of cast iron and steel wheels; conditions limiting life obtained from wheels and expedients used to increase mileage of wheels in service; methods, equipment and shop arrangement used in maintaining wheels and axles.

CARS, COAL

Composite Hopper. Composite Hoppers for the Nickel Plate. Ry. Mech. Engr., vol. 97, no. 11, Nov. 1923, pp. 754–756, 6 figs., also Ry. Age, vol. 75, no. 16, Oct. 20, 1923, pp. 703–704, 3 figs. Wooden sides and flooring are found to be more economical than all steel in cost of building and maintenance.

Planned Repetitive Manufacture. Planned Repetitive Manufacture of Heavy Equipment—Steel Coal Cars, William B. Ferguson. Management & Administration, vol. 6, no. 5, Nov. 1923, pp. 585–592, 11 figs. Deals with manufacturing to order or on contract small number of articles of same design; example selected is that of order of 1500 steel coal cars, hopper type of 57½-tons cap., manufactured for Chesapeake & Ohio R. R.

CARS, FREIGHT

Platform. Platform and Low-Loading Cars for Industrial Railways (Schwerlast- und Tiefladewagen für bodenständige Bahnen), H. Buhle. Fördertechnik u. Frachtverkehr, vol. 16, no. 18, Sept. 18, 1923, pp. 201–206, 19 figs. Standard-gage platform cars, low-loading cars and special types of heavy-load cars built by Fried, Krupp Corp.; low-platform cars of Hannover Machine-Bldg. Corp.; other German types of low-loading cars.

CARS, PASSENGER

Manufacture. Mass Production of Railway Carriages. Ry. Gaz., vol. 39, no. 15, Oct. 12, 1923, pp. 449–454, 15 figs. Describes system recently introduced at Derby Carriage & Wagon Works of Lond., Midland & Scottish Ry., based on use of limit gages, main object of which is, by means of production methods to increase output capacity of works.

Sleepers. New Sleeping Cars, Buenos Ayres Great Southern Railway. Ry. Gaz., vol. 39, no. 18, Nov. 2, 1923, p. 553, 2 figs. There are two compartments of four berths each, and remainder are two-berth compartments; coach is divided into two portions by a central entrance, compartments being in blocks of 16 and 14 berths respectively, in positions diagonally opposite; length over buffers 81 ft.; width over side matching 10 ft. 6 in.; weight 43 tons.

Sleeping Cars on the London & North Eastern Railway. Ry. Gaz., vol. 39, no. 15, Oct. 12, 1923, pp. 460–461, 4 figs. Comparison between two single-unit cars and a twin car on articulated principle.

CAST IRON

Marine-Engine Castings. A Note upon Cast Iron for Marine Engine Castings from the Metallurgical and Engineering Points of View, H. J. Young and E. Wood. Inst. Mar. Engrs.—Trans., vol. 11, no. 5, Oct. 1923, pp. 209–221, 8 figs. Deals with more common difficulties of work, as met by engineer and chemist working in coöperation.

CASTINGS

Defects. Defective Ferrous and Non-Ferrous Castings, Wallace Dent Williams. Can. Foundryman, vol. 14, nos. 9 and 10, Sept. and Oct. 1923, pp. 18–19 and 21, and 18–19, 7 figs. Reviews defects and considers some specially manufactured pieces and expresses his opinion as to best method of manufacturing such pieces.

CENTRAL STATIONS

Gas-Engine-Driven. Gas Driven Alternators for South Africa. S. African Min. & Eng. Jl., vol. 34, no. 1663, Aug. 11, 1923, pp. 677–678. Describes power plant of Salisbury central station, at Rhodesia, to consist of two Browett-Lindley 4-cylinder vertical 4-stroke-cycle gas engines, each direct coupled to a 300-kw. alternator with exciter, and four 300-hp. double-draft gas producers; description of gas producers, gas engines and alternator.

Interconnection. Interconnection in New York State. Elec. World, vol. 82, no. 20, Nov. 17, 1923, pp. 1013–1016, 1 map on supp. plate. Study of proposed inter-company network designed to give largest power pool in America; itemization of savings, operating procedure and control; recommendation for immediate development. Present situation with reference to interconnection in New York and neighboring states is shown in map.

CHAIN DRIVE

Types. Points to Consider in Using Various Types and Kinds of Chain Drives, Frank E. Gooding. Indus. Engr., vol. 81, nos. 7, 8 and 9, July, Aug, and Sept. 1923, pp. 335–339 and 373–373, 379–382, and 432–437 and 470, 28 figs. Salient characteristics and considerations which govern selection of different types of chain drives for various purposes; information regarding service conditions which should be known and used as basis for specifying proper chain for given drive; practical details of specific installations.

CHARTS

Semi-Logarithmic. The Semi-Logarithmic Chart, Allan C. Haskell. Indus. Management (N. Y.), vol. 66, no. 5, Nov. 1923, pp. 300–301, 5 figs. Use of semi-logarithmic charts to measure relative on percentage variations; their value for showing percentage variations.

Thermotechnical Calculations. Nomographical Method for the Solution of Thermotechnical and

Manufactured by Advertisers

CLASSIFIED LIST OF MECHANICAL EQUIPMENT

Alphabetical List on page 168

Conveyors, Chain
* Brown Hoisting Machinery Co.
Chain Belt Co.
Link-Belt Co.

Conveyors, Ice
Chain Belt Co.
* Gifford-Wood Co.
Link-Belt Co.

Conveyors, Portable
* Gifford-Wood Co.
Link-Belt Co.

Conveyors, Screw
Chain Belt Co.
* Gifford-Wood Co.
Link-Belt Co.

Cooling Ponds, Spray
* Cooling Tower Co. (Inc.)
* Schutte & Koerting Co.
* Spray Engineering Co.

Cooling Towers
* Burhorn, Edwin Co.
* Cooling Tower Co. (Inc.)
* Spray Engineering Co.
* Wheeler, C. H. Mfg. Co.
Wiederholdt Construction Co.
* Worthington Pump & Machinery Corp'n

Copper, Drawn
* Roebling's, John A. Sons Co.

Copper Converting Machinery
* Allis-Chalmers Mfg. Co.
* Worthington Pump & Machinery Corp'n

Counters, Revolution
* American Schaeffer & Budenberg Corp'n
* Ashton Valve Co.
* Bristol Co.
* Crosby Steam Gage & Valve Co.
Veeder Mfg. Co.

Countershafts
* Builders Iron Foundry
* Wood's, T. B. Sons Co.

Couplings, Pipe
Byers, A. M. Company
* Central Foundry Co.
* Crane Co.
Lunkenheimer Co.

Coupling, Shaft (Flexible)
* Allis-Chalmers Mfg. Co.
* Brown, A. & F. Co.
* Falk Corporation
* Fawcus Machine Co.
* Jones, W. A. Fdry. & Mach. Co.
* Medart Co.
* Nordberg Mfg. Co.
* Smith & Serrell

Coupling, Shaft (Rigid)
* Allis-Chalmers Mfg. Co.
* Brown, A. & F. Co.
Chain Belt Co.
Cumberland Steel Co.
* Falls Clutch & Machinery Co.
Farrel Foundry & Machine Co.
* General Electric Co.
* Jones, W. A. Fdry. & Mach. Co.
Link-Belt Co.
* Medart Co.
* Royersford Fdry. & Mach. Co.
* Smith & Serrell
* Wood's, T. B. Sons Co.

Couplings, Universal Joint
* Wood's, T. B Sons Co.

Coverings, Steam Pipe
Carey, Philip Co.
Johns-Manville (Inc.)

Cranes, Electric Traveling
Northern Engineering Works
* Whiting Corporation

Cranes, Floor (Portable)
* Elwell-Farker Electric Co.
Lidgerwood Mfg. Co.

Cranes, Gantry
* Brown Hoisting Machinery Co.
Link-Belt Co.
Northern Engineering Works
* Whiting Corp'n

Cranes, Hand Power
* Brown Hoisting Machinery Co.
Clyde Iron Works Sales Co.
Northern Engineering Works
* Whiting Corp'n

Cranes, Jib
* Brown Hoisting Machinery Co.
* Elwell-Parker Electric Co.
Northern Engineering Works
* Whiting Corp'n

Cranes, Locomotive
* Brown Hoisting Machinery Co.
Link-Belt Co.
* Whiting Corp'n

Cranes, Locomotive (Crawler)
Link-Belt Co.

Cranes, Pillar
* Brown Hoisting Machinery Co.
Northern Engineering Works
* Whiting Corp'n

Cranes, Portable
* Brown Hoisting Machinery Co.
Clyde Iron Works Sales Co.
Link-Belt Co.

Cranes, Tractor
* Elwell-Parker Electric Co.

Crucibles, Graphite
Dixon, Joseph Crucible Co.

Crushers, Clinker
Farrel Foundry & Machine Co.

Crushers, Coal
* Allis-Chalmers Mfg. Co.
* Brown Hoisting Machinery Co.
* Fuller-Lehigh Co.
* Gifford-Wood Co.
Link-Belt Co.
Pennsylvania Crusher Co.
* Smidth, F. L. & Co.
* Worthington Pump & Machinery Corp'n

Crushers, Hammer
Pennsylvania Crusher Co.

Crushers, Jaw
Farrel Foundry & Machine Co.
* Worthington Pump & Machinery Corp'n

Crushers, Ore and Rock
Farrel Foundry & Machine Co.
* Nordberg Mfg. Co.
Pennsylvania Crusher Co.

Crushers, Roll
Link-Belt Co.
Pennsylvania Crusher Co.
* Worthington Pump & Machinery Corp'n

Crushing and Grinding Machinery
* Allis-Chalmers Mfg. Co.
Farrel Foundry & Machine Co.
* Fuller-Lehigh Co.
Pennsylvania Crusher Co.
* Smidth, F. L. & Co.
* Worthington Pump & Machinery Corpn'

Cupolas
* Bigelow Co.
Northern Engineering Works
* Whiting Corp'n

Cutters, Bolt
* Landis Machine Co. (Inc.)

Cutters, Milling
* Whitney Mfg. Co.

Dehumidifying Apparatus
* American Blower Co.
* Atmospheric Conditioning Corp'n
* Carrier Engineering Corp'n

Derricks and Derrick Fittings
Clyde Iron Works Sales Co.
Lidgerwood Mfg. Co.

Diaphragms, Rubber
* United States Rubber Co.

Die Castings
(See Castings, Die Molded)

Die Heads, Thread Cutting (Self-opening)
* Jones & Lamson Machine Co.
* Landis Machine Co. (Inc.)

Dies, Punching
* Niagara Machine & Tool Works

Dies, Sheet Metal Working
* Niagara Machine & Tool Works

Dies, Stamping
* Niagara Machine & Tool Works

Dies, Thread Cutting
* Curtis & Curtis Co.
* Jones & Lamson Machine Co.
* Landis Machine Co. (Inc.)

Diesel Engines
(See Engines, Oil, Diesel)

Digesters
* Bigelow Co.

Digesters, Welded
Kellogg, M. W. Co.

Distilling Apparatus
* Vogt, Henry Machine Co.

Drafting Room Furniture
Dietzgen, Eugene Co.
Economy Drawing Table & Mfg. Co.
Keuffel & Esser Co.
ParVell Laboratories
Weber, F. Co. (Inc.)

Drawing Instruments and Materials
Dietzgen, Eugene Co.
Keuffel & Esser Co.
ParVell Laboratories
Weber, F. Co. (Inc.)

Dredges, Hydraulic
* Morris Machine Works

Dredging Machinery
Lidgerwood Mfg. Co.
* Morris Machine Works

Dredging Sleeve
* United States Rubber Co.

Drilling Machines, Sensitive
* Royersford Fdry. & Mach. Co.

Drilling Machines, Vertical
* Royersford Fdry. & Mach. Co.

Drills, Coal and Slate
* General Electric Co.
* Ingersoll-Rand Co.

Drills, Core
* Ingersoll-Rand Co.

Drills, Rock
* General Electric Co.
* Ingersoll-Rand Co.

Drinking Fountains, Sanitary
Johns-Manville (Inc.)
Manufacturing Equip. & Engrg. Co.

Dryers, Rotary
* Bigelow Co.
Farrel Foundry & Machine Co.
* Fuller-Lehigh Co.
Kellogg, M. W. Co.
Link-Belt Co.
* Sturtevant, B. F. Co.

Drying Apparatus
* American Blower Co.
* Atmospheric Conditioning Corp'n
* Carrier Engineering Corp'n
* Clarage Fan Co.
Philadelphia Drying Mchry. Co.
* Sturtevant, B. F. Co.

Dust Collecting Systems
* Allington & Curtis Mfg. Co.
* Allis-Chalmers Mfg. Co.
* Atmospheric Conditioning Corp'n
* Clarage Fan Co.
* Sturtevant, B. F. Co.

Dust Collectors
* Allington & Curtis Mfg. Co.
* Allis-Chalmers Mfg. Co.
* Sturtevant, B. F. Co.

Dyeing Machinery
Philadelphia Drying Mchry. Co.

Dynamometers
* American Schaeffer & Budenberg Corp'n
* General Electric Co.
* Wheeler, C. H. Mfg. Co.

Economizers, Fuel
* Green Fuel Economizer Co.
* Sturtevant, B. F. Co.

Ejectors
* Schutte & Koerting Co.

Electrical Machinery
* Allis-Chalmers Mfg. Co.
* General Electric Co.
* Westinghouse Electric & Mfg. Co.

Electrical Supplies
* General Electric Co.
Johns-Manville (Inc.)

Elevating and Conveying Machinery
* Brown Hoisting Machinery Co.
Chain Belt Co.
* Elwell-Parker Electric Co.
* Gifford-Wood Co.
* Jones, W. A. Fdry. & Mach. Co.
Link-Belt Co.

Elevators, Electric
* American Machine & Foundry Co.
Northern Engineering Works

Elevators, Hydraulic
* Whiting Corp'n

Elevators Passenger and Freight
Northern Engineering Works

Elevators, Pneumatic
* Whiting Corp'n

Elevators, Portable
* Gifford-Wood Co.
Link-Belt Co.

Elevators, Telescopic
Link-Belt Co.

Emery Wheel Dressers
* Builders Iron Foundry

Engine Repairs
* Franklin Machine Co.
* Nordberg Mfg. Co.

Engine Stops
* Schutte & Koerting Co.

Engines, Blowing
* Allis-Chalmers Mfg. Co.
Mackintosh-Hemphill Co.
* Nordberg Mfg. Co.
* Worthington Pump & Machinery Corp'n

Engines, Gas
* Allis-Chalmers Mfg. Co.
* De La Vergne Machine Co.
* Ingersoll-Rand Co.
Otto Engine Works
Sterling Engine Co.
* Titusville Iron Works Co.
* Westinghouse Electric & Mfg. Co.

Engines, Gasoline
Otto Engine Works
Sterling Engine Co.
* Sturtevant, B. F. Co.
* Titusville Iron Works Co.
* Worthington Pump & Machinery Corp'n

Engines, Hoisting
* Allis-Chalmers Mfg. Co.
Clyde Iron Works Sales Co.
Lidgerwood Mfg. Co.
* Morris Machine Works
* Nordberg Mfg. Co.

Engines, Kerosene
* Worthington Pump & Machinery Corp'n

Engines, Marine
* Ingersoll-Rand Co.
Johnson, Carlyle Machine Co.
* Nordberg Mfg. Co.
Sterling Engine Co.
* Sturtevant, B. F. Co.
* Ward, Chas. Engineering Works
* Worthington Pump & Machinery Corp'n

Engines, Marine, Oil
* Ingersoll-Rand Co.
* Nordberg Mfg. Co.

Engines, Marine, Steam
* Nordberg Mfg. Co.

Engines, Oil
* Allis-Chalmers Mfg. Co.
* De La Vergne Machine Co.
* Ingersoll-Rand Co.
* Nordberg Mfg. Co.
Otto Engine Works
* Titusville Iron Works Co.
* Worthington Pump & Machinery Corp'n

Engines, Oil, Diesel
* Allis-Chalmers Mfg. Co.
* Nordberg Mfg. Co.
* Worthington Pump & Machinery Corp'n

Engines, Pumping
* Allis-Chalmers Mfg. Co.
* Ingersoll-Rand Co.
* Morris Machine Works
* Nordberg Mfg. Co.
Sterling Engine Co.
* Worthington Pump & Machinery Corp'n

Engines, Steam
* Allis-Chalmers Mfg. Co.
* American Blower Co.
* Ames Iron Works
* Brownell Co.
* Clarage Fan Co.
Clyde Iron Works Sales Co.
* Cole, R. D. Mfg. Co.
* Engberg's Electric & Mech. Wks.
* Erie City Iron Works
* Harrisburg Fdry. & Mach. Wks.
* Ingersoll-Rand Co.
* Leffel, James & Co.
Lidgerwood Mfg. Co.
Mackintosh-Hemphill Co.
* Morris Machine Works
* Nordberg Mfg. Co.
Ridgway Dynamo & Engine Co.
* Sturtevant, B. F. Co.
* Titusville Iron Works Co.
* Troy Engine & Machine Co.
* Vilter Mfg. Co.
* Westinghouse Electric & Mfg. Co.
* Wheeler, C. H. Mfg. Co.

Engines, Steam, Automatic
* American Blower Co.
* Ames Iron Works
* Brownell Co.
* Clarage Fan Co.
* Engberg's Electric & Mech. Wks.
* Erie City Iron Works
* Frost Mfg. Co.
* Harrisburg Fdry. & Mach. Wks.
* Leffel, James & Co.
* Sturtevant, B. F. Co.
* Troy Engine & Machine Co.
* Westinghouse Electric & Mfg. Co.

Engines, Steam, Corliss
* Allis-Chalmers Mfg. Co.
* Franklin Machine Co.
* Frick Co. (Inc.)
* Harrisburg Fdry. & Mach. Wks.
Mackintosh-Hemphill Co.
* Nordberg Mfg. Co.
* Vilter Mfg. Co.

*Catalogue data of firms marked * appear in the A.S.M.E. Condensed Catalogues of Mechanical Equipment, 1923-24 Volume*

Mathematically Related Problems (Nomographische Verfahren zur Lösung wärmetechnischer Probleme sowie mathematisch verwandter Aufgaben), Felix Wolf. Wissenschaftliche Veröffentlichungen aus dem Siemens-Konzern, vol. 3, no. 1, May 15, 1923, pp. 77–93, 19 figs. Presents differential equation which is integrated and exemplifies its application to physical phenomena.

CHIMNEYS

Heat Losses in. Analysis of Heat Losses in Chimneys According to the CO_2 Content of the Exhaust Gases (Zur Beurteilung der Wärmeverluste im Schornstein nach dem CO_2-Gehalt der Abgase), L. Litinsky. Feuerungstechnik, vol. 11, no. 22, Aug. 15, 1923, pp. 217–219. Chimney losses when firing with solid fuels; losses in connection with excess air with gaseous fuels; necessity of analysis of fuels.

Steel. Steel Chimneys. Indian & Eastern Engr., vol. 52, no. 1, July 1923, pp. 14–16a, 8 figs. Necessity for support; details of design; venturi type of stack; advantages of steel over brick chimneys.

Tall. Tall Chimneys, W. Wallace Christie. Combustion, vol. 9, no. 5, Nov. 1923, pp. 368–374 and 383, 16 figs. Discusses chimney bases, shafts, lightning protection, masonry, steel chimneys, venturi type, concrete stacks, and describes various types, including some exceptionally tall chimneys.

CHROME-VANADIUM STEEL

Analysis. The Analysis of Chrome-Vanadium Steel, G. E. F. Lundell, J. I. Hoffman and H. A. Bright. Indus. & Eng. Chem., vol. 15, no. 10, Oct. 1923, pp. 1064–1069. Particular emphasis is paid to determinations which are troublesome in analysis of chrome-vanadium steel, namely, chromium, vanadium, and manganese.

CLUTCHES

Centrifugal. Centrifugal Clutches. Practical Engr., vol. 68, nos. 1903 and 1904, Aug. 16 and 23, pp. 87–90 and 102–104, 17 figs. Advantages of various types of clutches; details of design and application.

Friction. A Review of Power Transmission Machinery. Belting, vol. 23, no. 3, Sept. 1923, pp. 36, 38 and 40, 13 figs. Description of Johnson, Lawton, Farrel, O. K., Hanson and Mule-Pull types of friction clutches.

COAL

Illinois, Analyses of. Analyses of Illinois Coals, G. W. Hawley. State of Ill. Dept. Registration and Education, Division of State Geol. Survey, Bul. no. 27, 1923, 68 pp., 1 fig. Analytical data of study of chemical character of Illinois coals based on new face samples collected in 1921 from approximately 100 mines in various parts of the state with a view to extending knowledge of chemical properties, heating quality, and special adaptability of Illinois coals.

COAL HANDLING

Conveyors. Mechanical Equipment Cuts Cost of Handling Coal, Russell B. Williams. Contract Rec. & Eng. Rev., vol. 37, no. 42, Oct. 17, 1923, pp. 992–993, 3 figs. Describes portable belt conveyor which piled coal at a cost of 15 cents per ton as against 40 cents by hand.

Floating Plants. Floating Coal-Handling Plants for Seaports (Schwimmende Kohlenverladeanlagen für Seehäfen), E. Krahnen. Fördertechnik u. Frachtverkehr, vol. 16, no. 16, Aug. 18, 1923, pp. 181–183, 5 figs. Floating steam slewing cranes for discharging coal from steamers; coat hoists for unloading coal steamers; coal hoists designed as coal ships for coaling steamers.

Piers. Immense Coal Pier of Virginian Railway Under Construction at Norfolk. Mfrs. Rec., vol. 84, no. 18, Nov. 1, 1923, pp. 97–99, 5 figs. Structure with 7200-ton-per-hr. capacity, features of which are car dumpers, elevator, 130-ton conveying cars, traveling towers with mechanical trimmers, all electrically operated.

COKE HANDLING

Loading and Transportation. Coke Loading and Transportation (Kokslöschung und Kokstransport) L. Rodde. Gas- u. Wasserfach, vol. 66, nos. 35, 36, 38, 40 and 42, Sept. 1, 8, 22, Oct. 6 and 20, 1923, pp. 521–524, 543–545, 568–570, 593–596 and 618–623, 11 figs. Discusses following aspects: Loading, transporting and storing; conditions which influence appearance of coke; thermotechnical and gas-technical considerations; simplicity of system; economical results; hygiene.

COLD STORAGE

Warehouse. Cold Storage Warehouse Has Unusual Design, Stewart T. Smith. Eng. News-Rec., vol. 91, no. 16, Oct. 18, 1923, pp. 633–635, 5 figs. Insulation requirements complicate design; railway track enters at third-floor level; asphalt and plaster wall coating put on with spray and cement gun.

CONDENSERS, STEAM

Steam Injectors and Water-Jet Pumps. Steam Injectors and Water-Jet Pumps in Condenser Plants (Dampfstrahlpumpe und Wasserstrahlpumpe bei Kondensationsanlagen), L. Heuser and K. Finzel. Schiffbau, vol. 24, no. 51–52, Sept. 19–26, 1923, pp. 785–791, 5 figs. Comparative tests show superiority of steam injectors over water-jet pumps.

Surface. Surface Condensers, John M. Drabelle. Sibley Jl. of Eng., vol. 37, no. 7, Oct. 1923, pp. 155–156 and 174. Factors that govern securing and maintaining of low absolute pressures.

Surface, Air Pumps for. The Selection of Air Pumps for Surface Condensers. Shipbldg. & Shipg. Rec., vol. 22, no. 15, Oct. 11, 1923, p. 452. Air capacity under working conditions; air in pump.

Tubes. Contributions to the Study of Corrosion of Condenser Tubes (Beiträge zur Kenntnis der Korrosion an Kondensatorrohren), E. Maas, and E. Liebreich. Zeit. für Metallkunde, vol. 15, no. 9, Sept. 1923, pp. 245–250, 6 figs. Account of tests carried out at Chem.-Tech. State Inst., Berlin; recommendations for treatment of surface of condenser tubes; increased protection of zinc-rich brass against local corrosion.

Determining the Economical Interval between Cleanings of Condenser Tubes, C. E. Colborn. Power, vol. 58, no. 21, Nov. 20, 1923, pp. 803–805, 4 figs. Most economical period between tube cleanings depends upon how fast sediment is deposited, cost of vacuum loss which varies with relative load to large extent, and cost of cleaning tubes.

CONVEYORS

Assembling. Speeding Up Transmission Assembling. Am. Mach., vol. 59, no. 17, Oct. 25, 1923, pp. 617–618, 5 figs. Installation of simple assembling conveyor increases output of same crew over 50 per cent.

Automobile Manufacturing Plants. The Application of Conveyor Equipment to a Small Production Plant, H. P. Harrison. Soc. Automotive Engrs.—Jl. vol. 13, no. 5, Nov. 1923, pp. 357–365, 25 figs. Conditions that determined whether power-driven or gravity-actuated conveyors should be used; various types required for handling raw stock, for machining operations, sub-assemblies and finished assemblies; conveyors for handling cylinder castings; handling parts between departments and machines; assembling transmissions, engines and axles; handling finished cars through final-inspection and touch-up operations; etc.

Bread-Cooling. Bread Cooling Conveyor, George Frederick, Zimmer. Indus. Management (Lond.), vol. 10, no. 9, Nov. 1, 1923, pp. 256–258, 3 figs. Describes system installed at bakery in Milwaukee, Wis.

Overhead. The Adaptability of the Overhead Conveyor, Matthew W. Potts. Indus. Management (N. Y.), vol. 66, no. 5, Nov. 1923, pp. 292–299, 10 figs. Deals with hoists, monorails and telphers.

Wood Shavings. Modern Shaving Conveyor Plant, Martell. Eng. Progress, vol. 4, no. 9, Sept. 1923, pp. 198–199, 4 figs. Construction of a shaving conveyor and dust-removing plant; describes piping, hoods, floor aspirators and sweep holes, wood separator, and shavings and dust separators.

COOPERATIVE SOCIETIES

Developments. Coöperation. Monthly Labor Rev., vol. 17, no. 4, Oct. 1923, pp. 184–195. Comparative study of coöperation in various countries; development of various types of coöperative societies; consumers' societies; court decision as to contract with coöperative marketing association, Kansas; development of building and loan associations in United States; strike of employees of English coöperative wholesale Society.

CORROSION

Tests. The Control of Motion and Aeration in Corrosion Tests, J. F. Thompson and R. J. McKay. Indus. & Eng. Chem., vol. 15, no. 11, Nov. 1923, pp. 1114–1118, 4 figs. Discusses mechanism by which variation in aeration and rate of motion affects corrosion rate; gives test method of control sufficiently accurate to reproduce results within about 5 per cent; results obtained in connection with series of 2000 tests on acid-resisting metals in 2 to 10 per cent sulphuric acid, duplicating conditions found in pickling steel sheets.

COST ACCOUNTING

Factory. Linking Accounting to Production, Ernst Just. Management & Administration, vol. 6, no. 4, Oct. 1923, pp. 491–493. Development of New German system of factory accounting called "energetic" method, principles and applications of which are explained; how assets at rest, consumed, newly produced and total assets are dealt with.

Precalculation and Economic Production (Vorkalkulation und wirtschaftliche Fertigung), C. Riedrich. Werkstattstechnik, vol. 17, no. 20, Oct. 15, 1923, pp. 599–600, 2 figs. Points out importance of modern factory organization with special regard to functions of cost finding and its difficulties when organization is not up-to-date.

Methods. "Is Our Investment in Cost Accounting Profitable?" Thomas W. Howard. Factory, vol. 31, nos. 2, 3, 4 and 5, Aug., Sept., Oct. and Nov. 1923, pp. 172–174, 216 and 218; 318–321; 466–467, 512, 514, 516 and 518, 3 figs; and 605–607, 1 fig. Consideration of questions in effective cost accounting from viewpoint of executive. Aug.: Common leaks and ways to stop them. Sept.: What the different cost methods are. Oct.: Job-cost method and where it works best. Nov. specification costs and how they compare with job costs.

CRANES

Cableway. Calculation of Ropes for Cableway Cranes (Zur Berechnung der Tragseile von Kabelkranen), V. Hirschhaut. Fördertechnik u. Frachtverkehr, vol. 16, no. 14. July 18, 1923, pp. 162–163. Simplified method of calculation.

Electric. Electric Cranes, Daniel Adamson. Elec. Rev., vol. 93, no. 2395, Oct. 19, 1923, pp. 567–568. Methods of electric control; crane protective panels; contractor panels.

Electrically Operated 25 t. Goliath Crane at the Goods Station at Zurich, W. Druey. Int. Ry. Congress—Bul., vol. 5, no. 10, Oct. 1923, pp. 961–962, 1 fig. Describes crane designed for loading and unloading furniture vans; also provided with auxiliary crabs for handling all types of goods. From Bul. Technique de la Suisse Romande.

Portable Battery. Three-Motor Portable Battery Crane. Engineering, vol. 116, no. 3018, Nov. 2, 1923, p. 558, 4 figs. Especially designed for handling freight on freight platforms; battery is Exide Ironclad type and has capacity of 258 ampere-hr. on 5-hr. rating.

CUPOLAS

Heat Balance. The Heat Balance of Cupolas (Die Wärmebilanz des Kupolofens). Giesserei-Zeitung, vol. 20, nos. 21 and 22, Oct. 1 and 15, 1923, pp. 412–415 and 429–431, 4 figs. Comparison of different analyses; probable values in ordinary practice; elements of heat balance; remarks on changes of separate expressions in heat balance; tests with re-dressed coke; heating cupola with pulverized coal or with heavy oil; use of hot air in cupolas for cast iron.

Waste-Heat Utilization. Utilizing the Waste Heat from the Cupola, G. Ernest Booker. Iron & Steel of Canada, vol. 6, no. 10, Oct. 1923, pp. 211–212, 4 figs. Ways in which heat of fuel consumed in operation of a foundry cupola can be used profitably.

CUTTING METALS

Oxygen Blowpipe Machine. The Oxytome Metal Cutting Machine. Engineer, vol. 136, no. 3537, Oct. 12, 1923, p. 404, 2 figs. Oxygen blowpipe machine developed by Alfred Herbert, Ltd., Coventry, England.

CUTTING TOOLS

Sharpening System. Centralized Cutter Sharpening System. Charles O. Herb. Machy. (N. Y.), vol. 30, no. 3, Nov. 1923, pp. 205–207, 7 figs. System for keeping machines supplies with sharp tools, developed at plant of Willys-Overland Co.

D

DIESEL ENGINES

Deutz Compressorless. Horizontal Diesel Motor Without Compressor. Eng. Progress, vol. 4, no. 9, Sept. 1923, pp. 181–184, 15 figs. Particulars of Deutz engines, Diesel engines without compressor and economic fuel consumption.

Marine. Marine Diesel Engine of 1600 Hp. (Schiffsdieselmotor von 1600 PS. der Motorenwerke Mannheim A.-G. vorm. Benz & Cie. in Mannheim), E. Josse. Zeit. des Vereines deutscher Ingenieure, vol. 67, no. 43, Oct. 27, 1923, pp. 1010–1012, 7 figs. Reversible 6-cylinder engine built by Mannheim Motorwerke, Inc., formerly Benz & Cie.; equipped with guide instead of crosshead, by which dimensions and weight of engine are reduced; results of 72-hr. trial; fuel and heat consumption; mechanical efficiency.

McIntosh & Seymour's New Big Diesel. Motorship, vol. 8, no. 11, Nov. 1923, pp. 772 and 775, 1 fig. American-designed marine engine of 2250 i.hp. which has completed successful trials.

DRILLING MACHINES

Radial. Improved Girder Radial Drilling Machines. Eng. Production, vol. 6, no. 134, Nov. 1923, p. 451, 1 fig. Describes 6-ft. machine constructed by George Swift & Sons, Ltd., Halifax, for operation upon girder and structural work, boiler and tank plates, etc.

Rotary Indexing Table. A New Drilling Device. Eng. Production, vol. 6, no. 134, Nov. 1923, p. 447, 3 figs. Describes device developed by Leyland Motors, Ltd., Leyland, Lancashire, Eng., to eliminate marking out in connection with drilling of circles of holes, comprising a rotary work table capable of being indexed radially.

DRYING

Process Chart. Graphic Presentation of Processes of Drying (Einiges aus dem Bilderbuch über Trocknungsvorgänge), Karl Reyscher. Gesundheits-Ingenieur, vol. 46, no. 42, Oct. 20, 1923, pp. 414–416, 3 figs. Describes simplified method by use of which diagram is obtained visualizing complicated phenomena of drying.

DURALUMIN

Tension Tests. Test on Riveted Joints in Sheet Duralumin, H. F. Rettew and G. Thumin. Nat. Advisory Committee for Aeronautics—Tech. Notes, no. 165, Nov. 1923, 7 pp., 3 figs. Results of tension tests on various forms of single-riveted lap joints. Abstracted and revised from thesis presented to Dept. of Mech. Eng. of Mass. Inst. of Technology.

E

EDUCATION, ENGINEERING

Fundamental Studies. Education for the Functional Divisions of Engineering, Edward Bennett. Am. Inst. Elec. Engrs.—Jl., vol. 42, no. 11, Nov. 1923, pp. 1145–1152. Presents for consideration courses of study in which fundamental studies of first two years are not identically same in all courses, but are avowedly different both in content and in aim; each course is intended to provide foundation for what is designated as one of basic types of engineering work or as one of functional divisions of engineering, these divisions being listed as engineering research, design, supervision, management, and sales.

ELECTRIC DRIVE

Hemp Spinning Mill. Electric Drives in a Hemp Spinning Mill (Elektrische Antriebe in einer Hanfspinnerei), Willi Mühlens. Siemens-Zeit., vol. 3, no. 8–9, Aug.-Sept. 1923, pp. 341–349, 10 figs. Describes success of use of electric drive, especially individual electric drives.

Manufactured by Advertisers — CLASSIFIED LIST OF MECHANICAL EQUIPMENT — Alphabetical List on page 168

Engine, Steam, High Speed
* American Blower Co.
* Ames Iron Works
* Brownell Co.
* Clarage Fan Co.
* Engberg's Electric & Mech. Wks.
* Erie City Iron Works
* Harrisburg Fdry. & Mach. Wks.
* Nordberg Mfg. Co.

Engines, Steam, Poppet Valve
* Ames Iron Works
* Erie City Iron Works
* Nordberg Mfg. Co.
* Vilter Mfg. Co.

Engines, Steam, Throttling
* Ames Iron Works
* Brownell Co.
* Clarage Fan Co.
* Engberg's Electric & Mech. Wks.
* Frost Mfg. Co.

Engines, Steam, Una-Flow
* Ames Iron Works
* Frick Co. (Inc.)
* Harrisburg Fdry. & Mach. Wks.
* Nordberg Mfg. Co.
Ridgway Dynamo & Engine Co.

Engines, Steam, Variable Speed
* Ames Iron Works
* Brownell Co.
* Harrisburg Fdry. & Mach. Wks.
* Nordberg Mfg. Co.

Engines, Steam, Vertical (Fully Enclosed, Self-Oiling)
* Clarage Fan Co.
* Engberg's Electric & Mech. Wks
* Troy Engine & Machine Co.

Engines, Steering
Lidgerwood Mfg. Co

Evaporators
* Croll-Reynolds Engrg. Co. (Inc.)
Farrel Foundry & Machine Co.
* Vogt, Henry Machine Co.

Excavating Machinery
Clyde Iron Works Sales Co.
Lidgerwood Mfg. Co.
Link-Belt Co.

Exhaust Heads
Hoppes Mfg. Co.
* Ruggles-Klingemann Mfg. Co.

Exhaust Systems
* Allington & Curtis Mfg. Co.
* American Blower Co.
* Clarage Fan Co.
* Sturtevant, B. F. Co.

Exhausters, Gas
* American Blower Co.
* Clarage Fan Co.
* General Electric Co.
* Green Fuel Economizer Co.
* Schutte & Koerting Co.
* Sturtevant, B. F. Co.

Extractors, Centrifugal
Fletcher Works
Tolhurst Machine Works

Extractors, Oil and Grease
* American Schaeffer & Budenberg Corp'n
* Kieley & Mueller (Inc.)

Factory Equipment, Metal
Manufacturing Equipment & Engrg. Co.

Fans, Exhaust
* American Blower Co.
* Clarage Fan Co.
* General Electric Co.
* Green Fuel Economizer Co.
Philadelphia Drying Mchry. Co.
* Sturtevant, B. F. Co.

Fans, Exhaust, Mine
* Sturtevant, B. F. Co.

Feeders, Pulverized Fuel
* Combustion Engineering Corp'n
* Fuller-Lehigh Co.
* Smidth, F. L. & Co.

Filters, Air
Reed Air Filter Co. (Inc.)

Filters, Gravity
* Permutit Co.

Filters, Oil
* Bowser, S. F. & Co. (Inc.)
Elliott Co.
* General Electric Co.
Nugent, Wm. W. & Co. (Inc.)

Filters, Pressure
* Graver Corp'n
* Permutit Co.

Filters, Water
Elliott Co.
* Graver Corp'n
* H. S. B. W.-Cochrane Corp'n
* Permutit Co.
* Scaife, Wm. B. & Sons Co.

Filtration Plants
* Graver Corp'n
* H. S. B. W.-Cochrane Corp'n
International Filter Co.
* Scaife, Wm. B. & Sons Co.

Fire Brick, Fire Hydrants, etc.
(See Brick, Hydrants, Fire, etc.)

Fittings, Ammonia
* Crane Co.
* De La Vergne Machine Co.
* Frick Co. (Inc.)
* Vilter Mfg. Co.
* Vogt, Henry Machine Co.

Fittings, Compression
* Bowser, S. F. & Co. (Inc.)
Lunkenheimer Co.

Fittings, Flanged
* Builders Iron Foundry
* Central Foundry Co.
* Crane Co.
* Edward Valve & Mfg. Co.
Kennedy Valve Mfg. Co.
Lunkenheimer Co.
* Pittsburgh Valve, Fdry. & Const. Co.
* Reading Steel Casting Co. (Inc.)
(Reading Valve & Fittings Div.)
* U. S. Cast Iron Pipe & Fdry. Co.
* Vogt, Henry Machine Co.

Fittings, Hydraulic
* Crane Co.
* Pittsburgh Valve, Fdry. & Const. Co.
* Reading Steel Casting Co. (Inc.)
(Reading Valve & Fittings Div.)
* Vogt, Henry Machine Co.

Fittings, Pipe
* Barco Mfg. Co.
* Central Foundry Co.
* Crane Co.
Kennedy Valve Mfg. Co.
Lunkenheimer Co.
* Pittsburgh Valve, Fdry. & Const. Co.
* Reading Steel Casting Co. (Inc.)
(Reading Valve & Fittings Div.)
* Vogt, Henry Machine Co

Fittings, Steel
* Crane Co.
* Edward Valve & Mfg. Co.
Lunkenheimer Co.
* Pittsburgh Valve, Fdry. & Const. Co.
* Reading Steel Casting Co. (Inc.)
(Reading Valve & Fittings Div.)
* Vogt, Henry Machine Co.

Flanges
* American Spiral Pipe Works
* Crane Co.
* Edward Valve & Mfg. Co.
Kennedy Valve Mfg. Co.
Lunkenheimer Co.
* Pittsburgh Valve, Fdry. & Const. Co.
* Reading Steel Casting Co. (Inc.)
(Reading Valve & Fittings Div.)
* Vogt, Henry Machine Co.

Floor Armor
* Irving Iron Works Co.

Floor Stands
* Chapman Valve Mfg. Co.
* Crane Co.
* Jones, W. A. Fdry. & Mach. Co.
Kennedy Valve Mfg. Co.
Lunkenheimer Co.
* Pittsburgh Valve, Fdry. & Const. Co.
* Reading Steel Casting Co. (Inc.)
(Pratt & Cady Division)
* Schutte & Koerting Co.
* Wood's, T. B. Sons Co.

Flooring-Grating
* Irving Iron Works Co.

Flooring, Metallic
* Irving Iron Works Co.

Flooring, Rubber
* United States Rubber Co.

Flour Milling Machinery
* Allis-Chalmers Mfg. Co.

Flue Gas Analysis Apparatus
* Tagliabue, C. J. Mfg. Co.

Fly Wheels
* Medart Co.
* Nordberg Mfg. Co.
* Wood's, T. B. Sons Co.

Forges
* Best, W. N. Corp'n

Forgings, Alloy Steel
* American Forge & Machine Co.

Forgings, Drop
* American Forge & Machine Co.
* Vogt, Henry Machine Co.

Forgings, Heavy
* American Forge & Machine Co.

Forgings, Iron and Steel
* American Forge & Machine Co.

Forgings, Steel
* American Forge & Machine Co.

Foundry Equipment
Northern Engineering Works
* Whiting Corp'n

Friction Clutches, Hoists, etc.
(See Clutches, Hoists, etc., Friction)

Friction Drives
Rockwood Mfg. Co.

Frictions, Paper and Iron
Link-Belt Co.
Rockwood Mfg. Co.

Fuel Economizers
(See Economizers, Fuel)

Furnace Construction
Furnace Engineering Co.

Furnaces, Annealing and Tempering
* Best, W. N. Corp'n
* General Electric Co.
* Kenworthy, Chas. F. (Inc.)
* Whiting Corp'n

Furnaces, Boiler
* American Engineering Co.
* American Spiral Pipe Wks.
* Babcock & Wilcox Co.
* Bernitz Furnace Appliance Co.
* Best, W. N. Corp'n
* Combustion Engineering Corp'n
* Detroit Stoker Co.
* Riley, Sanford Stoker Co.

Furnaces, Case Hardening
* Kenworthy, Chas. F. (Inc.)

Furnaces, Down Draft
* O'Brien, John Boiler Works Co.

Furnaces, Electric
Detroit Electric Furnace Co.
* Kenworthy, Chas. F. (Inc.)

Furnaces, Forging
* Kenworthy, Chas. F. (Inc.)

Furnaces, Hardening
* Kenworthy, Chas. F. (Inc.)

Furnaces, Heat Treating
* Best, W. N. Corp'n
* General Electric Co.
* Kenworthy, Chas. F. (Inc.)

Furnaces, Melting
* Best, W. N. Corp'n
Detroit Electric Furnace Co.
* General Electric Co.
* Whiting Corp'n

Furnace, Non-Ferrous
Detroit Electric Furnace Co.

Furnaces, Non-Oxidizing
* Kenworthy, Chas. F. (Inc.)

Furnaces, Oil
Best, W. N. Corp'n

Furnaces, Smokeless
* American Engineering Co.
* Babcock & Wilcox Co.
* Combustion Engineering Corp'n
* Detroit Stoker Co.
Herbert Boiler Co.
* Riley, Sanford Stoker Co.

Fuses
* General Electric Co.
Johns-Manville (Inc.)

Gage Boards
* American Schaeffer & Budenberg Corp'n
* Ashton Valve Co.
* Crosby Steam Gage & Valve Co.

Gage Glasses
* American Schaeffer & Budenberg Corp'n

Gage Glasses, Inclined
Sesure Water Gauge Co.

Gage Testers
* American Schaeffer & Budenberg Corp'n
* Ashton Valve Co.
* Crosby Steam Gage & Valve Co.

Gages, Altitudes
* American Schaeffer & Budenberg Corp'n
* Ashton Valve Co.
* Crosby Steam Gage & Valve Co.

Gages, Ammonia
* American Schaeffer & Budenberg Corp'n
* Ashton Valve Co.
* Crosby Steam Gage & Valve Co.
* Vogt, Henry Machine Co.

Gages, Differential Pressure
* American Schaeffer & Budenberg Corp'n
Bacharach Industrial Instrument Co.
* Bailey Meter Co.
* Tagliabue, C. J. Mfg. Co.
* Uehling Instrument Co.

Gages, Draft
* American Schaeffer & Budenberg Corp'n
* Ashton Valve Co.
Bacharach Industrial Instrument Co.
* Bailey Meter Co.
* Bristol Co.
* Tagliabue, C. J. Mfg. Co.
* Taylor Instrument Cos.
* Uehling Instrument Co.

Gages, Hydraulic
* American Schaeffer & Budenberg Corp'n
* Ashton Valve Co.
* Crosby Steam Gage & Valve Co.

Gages, Liquid Level
* Bristol Co.
Lunkenheimer Co.
* Simplex Valve & Meter Co.

Gages, Loss of Head
* Builders Iron Foundry
* Simplex Valve & Meter Co.

Gages, Measuring (Surface, Depth, Dial, etc.)
* Norma Co. of America

Gages, Pressure
* American Schaeffer & Budenberg Corp'n
* Ashton Valve Co.
Bacharach Industrial Instrument Co.
* Bailey Meter Co.
* Bristol Co.
* Crosby Steam Gage & Valve Co.
* Tagliabue, C. J. Mfg. Co.
* Uehling Instrument Co.

Gages, Rate of Flow
Bacharach Industrial Instrument Co.
* Bailey Meter Co.
* Builders Iron Foundry
* Simplex Valve & Meter Co.

Gages, Syphon
* Tagliabue, C. J. Mfg. Co.

Gages, Vacuum
* American Schaeffer & Budenberg Corp'n
* Ashton Valve Co.
Bacharach Industrial Instrument Co.
* Bristol Co.
* Crosby Steam Gage & Valve Co.
* Tagliabue, C. J. Mfg. Co.
* Taylor Instrument Cos.
* Uehling Instrument Co.

Gages, Water
* American Schaeffer & Budenberg Corp'n
* Ashton Valve Co.
* Bristol Co.
* Crane Co.
* Jenkins Bros.
Lunkenheimer Co.
* Reading Steel Casting Co. (Inc.)
(Pratt & Cady Division)
* Simplex Valve & Meter Co.

Gages, Water Level
* American Schaeffer & Budenberg Corp'n
* Bristol Co.
Lunkenheimer Co.
* Simplex Valve & Meter Co.

Gas Holders
Improved Equipment Co.

Gas Plant Machinery
* Cole, R. D. Mfg. Co.
Improved Equipment Co.

Gas Plants
Improved Equipment Co.

Gas Washers
Improved Equipment Co.

Gaskets
* Goetze Gasket & Packing Co.
* Jenkins Bros.
Johns-Manville (Inc.)
* Sarco Co. (Inc.)

Gaskets, Iron, Corrugated
Smooth-On Mfg. Co.

Gaskets, Rubber
* Goodrich, B. F. Rubber Co.
* United States Rubber Co.

Gates, Cut-off
Link-Belt Co.

Gates, Sluice
* Chapman Valve Mfg. Co.
Philips & Davies
* Pittsburgh Valve, Fdry. & Const. Co

Gear Cutting Machines
* Jones, W. A. Fdry. & Mach. Co.

Gear Hobbing Machines
* Jones, W. A. Fdry. & Mach. Co.

Gears, Bakelite
Ganschow, Wm. Co.

*Catalogue data of firms marked * appear in the A.S.M.E. Condensed Catalogues of Mechanical Equipment, 1923-24 Volume*

Workshops. Electric Drive for Engineering Workshops, J. Scoular. Commonwealth Engr., vol. 10, nos. 11 and 12, June 1 and July 1, 1923, pp. 408–409 and 446–451, 8 figs. Application and advantages of electric drive for operation of machine tools and other machinery employed in workshops; principles of efficient operation.

ELECTRIC FURNACES

Cathode Radiation. A Cathode Radiation Furnace (Ein Kathodenstrahlofen), Hans Gerdien and Hans Riegger. Wissenschaftliche Veröffentlichungen aus dem Siemens-Konzern, vol. 3, no. 1, May 15, 1923, pp. 226–230, 3 figs. Consists of a ball-shaped vessel, from wall of which the cathode radiations run radially toward preparation to be heated which is located in middle of vessel.

Electrodes. Automatic Hydraulic Regulation of Furnace Electrodes. Electricity, vol. 37, no. 1679, Jan. 12, 1923, pp. 13–14, 1 fig. Describes hydraulic system of electrode control, developed by Brown, Boveri & Co., providing a direct-acting mechanism which requires no sensitive relays, is free from delay in operation, and has no backlash or overshooting.

Fiat. The New Electric Steel Furnaces at the Fiat Works in Turin, G. Vitali. Electrician, vol. 91, no. 2366, Sept. 21, 1923, pp. 305–306, 4 figs. Description of Fiat furnaces, and excellent results obtained from them. Abstract from Elektrotechnische Zeit.

Size and Costs. Size of Furnace Affects Costs, Larry J. Barton. Iron Trade Rev., vol. 73, no. 19, Nov. 8, 1923, pp. 1309–1310. Conditions which govern selection of size of furnace and operating costs for large and small installations based upon output; little difference is found in costs per ton.

Tool Tempering. Electric Furnaces in Tool Room on I. C. Ry. Elec. Engr., vol. 14, no. 10, Oct. 1923, pp. 314–315, 5 figs. Describes equipment at Burnside (Chicago) shop of Illinois Central, consisting of electric furnaces and ovens for hardening and drawing purposes; Hoskins carbon resistor furnace, return bend coil furnace made by Elec. Heat. Apparatus Co., and others.

ELECTRIC LOCOMOTIVES

Baldwin - Westinghouse. Baldwin-Westinghouse Electric Locomotives for Trunk Line Service, Paul T. Warner. Baldwin Locomotives. Baldwin Locomotives, vol. 2, no. 2, Oct. 1923, pp. 28–39, 12 figs. Describes different types of Baldwin-Westinghouse locomotives in use on different railways.

Transmission by Connecting Rods. New type of Transmission by Coupling Rods for Electric Locomotives. Int. Ry. Congress—Bul., vol. 5, no. 10, Oct. 1923, pp. 963–965, 2 figs. Extract of article by Joseph Bianchi published in Revue Générale des Chemins de Fer, Feb. 1923.

ELECTRIC MEASURING INSTRUMENTS

Boiler Plants. Electric Measuring Instruments in Steam Plants (Elektrische Messgeräte für Dampfbetriebe), G. Quaink. Dinglers Polytechnisches Journal, vol. 338, no. 13–14, July 14, 1923, pp. 141–145, 13 figs. Describes different types of CO and CO_2 indicators, thermometers, thermo elements, filament pyrometers, etc., and their application.

Long-Distance. New Electrical Recording System As Used in Pulp and Paper Mills, L. G. Bean. Paper Trade Jl., vol. 77, no. 19, Nov. 8, 1923, pp. 45–46, 2 figs. Describes instrument designed and distributed by Bristol Co., of Boston, Mass., which enables a measurement of pressure, temperature, liquid level, flow, motion or other qualities, to be made at a distance up to several miles from point at which actual condition takes place.

ELECTRIC WELDING, ARC

A. C. Machine. A Pacific Coast Alternating Current Arc Welder. West. Machy. World, vol. 14, no. 10, Oct. 1923, pp. 324–325, 5 figs. Describes a. c. arc-welding equipment of simple construction and operation, developed and manufactured by Welding Service & Supply Co., San Francisco, Cal.

Cast Iron. Welding Cast Iron With a Special Nickel Copper Alloy Welding Wire, Alexander Churchward. Am. Welding Soc.—Jl., vol. 2, no 9, Sept. 1923, pp. 17–19, 3 figs. Describes successful method of welding cast iron involving new principle of absorbing carbon contained in cast iron, forming thereby at juncture of weld a new alloy which not only insures strength equal to that of original casting, but also permits ready machining; accomplished without preheating, annealing or use of studs.

Efficiency. Efficiency of Arc Welding, R. D. Reed. Welding Engr., vol. 8, no. 10, Oct. 1923, pp. 28–29, 3 figs. Choosing machine for work; selection of electrodes and adjusting welding current.

Steel Ship Masts. The Manufacture of Welded Steel Masts, A. G. Bissell. Mar. News, vol. 10, no. 6, Nov. 1923, p. 75. Describes construction of fourteen steel masts for seven seagoing tugs at U. S. Navy Yard at Puget Sound, parts of which were entirely assembled by arc welding.

ELECTRIC WELDING, RESISTANCE

Sheet Metal. Resistance Welding of Sheet Metal, H. W. Tobey. Am. Welding Soc.—Jl., vol. 2, no. 9, Sept. 1923, pp. 24–28, 28 figs. Results of tests made on various forms of sheet metal.

ELEVATORS

Cables, Used, Strength of. Chart for Determining the Strength of Used Elevator Cables, C. W. Willetts. Power, vol. 58, no. 20, Nov. 13, 1923, pp. 762–764, 2 figs. Gives formula which is based on tests made on used cables and wires described in same journal (Sept. 18), and chart which was worked out to accomplish calculations that formula is intended to perform.

Governors. Operation of Over-Speed Governors on Electric Elevators, Howard B. Cook, Power, vol. 58, no. 17, Oct. 23, 1923, pp. 651–652, 2 figs. Comparison of different types of elevator governors and advantages and disadvantages of each.

Hydraulic vs. Electric. Electric and Hydraulic Elevators in Modern Buildings, James A. McHollan. Architectural Forum, vol. 39, no. 4, Oct. 1923, pp. 169–174, 4 figs. Some of the latest improvements in electric elevator equipment, together with operating records from existing plants; comparative cost figures of electric and hydraulic elevators.

EMPLOYEES' REPRESENTATION

Discipline and. Employee Representation and Discipline, Elisha Lee. Ry. Age, vol. 75, no. 19, Nov. 10, 1923, pp. 855–857. Experience on Pennsylvania indicates that disciplinary control has been strengthened.

EMPLOYMENT MANAGEMENT

Pension Costs. Pension Costs and the Labor Turnover Factor, Joseph H. Woodward. Management & Administration, vol. 6, no. 4, Oct. 1923, pp. 483–486, 1 fig. Method of determining cost as percentage of payroll.

ENGINEERING

Automobile. Automobile Engineering as a Profession, H. G. Burford. Automobile Engr., vol. 13, no. 181, Oct. 1923, pp. 316–319. Notes on standardization; roads and their relation to transport; legislation; education and training of automobile engineer; part to be played by Institution.

ENGINEERS

Achievements of. The Rise of The Engineer, C. R. Young. Eng. Jl., vol. 6, no. 11, Nov. 1923, pp. 508–512. Review of what engineers have achieved; early status of engineer; growth of confidence in engineer; influence of engineering societies; profession vs. business; future of engineering.

Relation to Public. The Relations of the Engineer to the Public, A. N. Johnson. Univ. of Va. Jl. Eng., vol. 3, no. 5, Jan. 1923, pp. 93 and 102. Points out that engineers, collectively and individually, should take more active part in public affairs, in order that they may be entrusted with greater responsibility in management of public affairs.

ENGINEHOUSES

Lighting. Enginehouse Lighting on the Great Northern. Ry. Elec. Engr., vol. 14, no. 10, Oct. 1923, pp. 299–300, 4 figs. Describes method of wiring enginehouses which has advantages of low first cost, overhead lights and durability; 32-volt extension circuits are a feature.

EXHAUST STEAM

Total Heat, Calculation of. Figuring the Total Heat of Exhaust Steam, A. G. Christie. Power, vol. 58, no. 18, Oct. 30, 1923, pp. 685–686, 1 fig. Methods by which total heat may be computed for turbines.

F

FANS

Air Measurement. Air Measurement Methods for Experimental Work on Fan-Pipe Installations, G. E. McElroy and A. S. Richardson. U. S. Bur. of Mines—Reports of Investigations, no. 2527, Sept. 1923, 2 pp. Results of experiments in Butte mine to determine friction factors for different types and sizes of fan piping.

FEEDWATER HEATERS

Locomotive. A New Feed-heater for Small Locomotives. Engineer, vol. 136, no. 3537, Oct. 12, 1923, p. 404, 1 fig. Also Ry. Mech. Engr., vol. 97, no. 11, Nov. 1923, p. 749, 1 fig. Describes smokebox feed heater for new type of locomotive designed by A. Borsig, Berlin-Tegel; hot gases enter heater through circular perforated cylinder and are entrained by annular series of steam jets placed below vertical smoke tubes of heater. Abstracted from Verkehrstechnik.

FLIGHT

Control at Low Speed. Control of Aeroplanes at Low Speeds, Melvill Jones. Roy. Aeronautical Soc.—Jl., vol. 27, no. 154, Oct. 1923, pp. 473–485 and (discussion) 485–487, 3 figs. Deals with control of airplane when stalled.

Gliding. Gliding and Gliders at Itford. Insth. Aeronautical Engrs.—Proc., no. 5, 1923, pp. 18–23. Discussion, dealing with future form of glider, speed, aerodynamical efficiency, lessons to be learned from gliders, etc.

Gliding Theory and the Operation of Gliders, Alexander Klemin. Aviation, vol. 15, no. 18, Oct. 29, 1923, pp. 544–549, 12 figs. Notes on gliding in still air; gliding with steady vertical and with steady horizontal currents; encountering gusts.

Possible Use of the Microphone to Facilitate Gliding (Sur l'emploi possible du microphone pour faciliter le vol à voile), Lafay. Académie des Sciences—Comptes Rendus des Séances, vol. 176, no. 13, Mar. 26, 1923, pp. 887–888. Suggests that a microphone suitably placed may enable a pilot to distinguish acoustically between rising and falling flight, or between rising and falling air columns, and that by using two microphones, one on each wing of a glider, it might be possible to get instantaneous indications regarding orientation of squalls met with by glider.

Static Gliding Flight Over Flat Coasts (Statischer Segelflug über Flachküsten), W. Georgii. Zeit. für Flugtechnik u. Motorluftschiffahrt, vol. 14, no. 13–14, July 26, 1923, pp. 114–115, 2 figs. Refers to vertical movements of air as source of energy for carrying out static gliding flight, namely, so-called forced and thermal ascending wind, and then discusses vertical movements caused by frictional changes of the air, known as frictional ascending wind.

FLOORS

Composition Flooring. Composition Flooring, Raymond R. Butler. Chem. & Industry, vol. 42, no. 41, Oct. 12, 1923, pp. 980–982. Deals with Portland cement, magnesite cements, bitumen rubber, calcium-sulphate cements, miscellaneous cements. Patent literature.

FLOW OF FLUIDS

Calculation. Simplifying the Solution of Problems of Fluid Flow, Barnett F. Dodge. Chem. & Met. Eng., vol. 29, no. 19, Nov. 5, 1923, pp. 844–846, 3 figs. Methods of calculation which eliminate procedure of trial and error heretofore in vogue.

FLUE-GAS ANALYSIS

CO Meters. At Last: A CO Meter. Fuels & Furnaces, vol. 1, no. 6, Oct. 1923, pp. 471–474, 4 figs. Describes simple electrical apparatus which gives percentage of CO almost instantly; in general, indications of combustible gases by this instrument are accurate within a few tenths of one per cent.

CO_2 Meters. An Electrical CO_2 Meter. Gas Age-Rec., vol. 52, no. 19, Nov. 10, 1923, pp. 587–588, 4 figs. Describes meter operating on principle different from usual chemical meter; utilizing physical property of heat conduction of gases.

FLYING BOATS

Aeromarine. Aeromarine Model AMC Commercial Flying Boat. Aviation, vol. 15, no. 18, Oct. 29, 1923, pp. 550–552, 6 figs. Features of new commercial passenger carrier based on air-line operation.

FLYWHEELS

Energy Effect. Energy Effect of a Flywheel or Rotating Mass, Robert Johnson. Machy. (Lond.), vol. 23, no. 578, Oct. 25, 1923, pp. 102–103, 4 figs. Use of chart designed by author, by means of which the "m" of wheel, or number of ft-lb. of kinetic energy stored at 1 r.p.m., can be read off by counting number of rectangles enclosed by section of flywheel.

FORGING

Locomotive Frames. Notable Economies in Forging Locomotive Frames. Ry. Rev., vol. 73, no. 19, Nov. 10, 1923, pp. 687–689, 7 figs. Beech Grove, Ind., shops of Big Four forge front end in one piece from scrap material.

FOUNDRIES

Cleaning-Room Costs. Determining Cleaning Room Costs, B. K. Price. Abrasive Industry, vol. 4, no. 11, Nov. 1923, pp. 311–313, 4 figs. Describes cost system at plant of Lebanon Steel Foundry, Lebanon, Pa., said to be unique in steel-foundry industry; wheel performance is based on amount of material removed in pounds with total cost expressed in terms of cents per pound removed.

Machine-Tool Castings. Makes Machine Tool Castings, Pat Dwyer. Foundry, vol. 51, no. 21, Nov. 1, 1923, pp. 853–857, 5 figs. Describes plant and equipment of Pratt & Whitney Co., Hartford, Conn., in which molding, melting and cleaning facilities are particularly adapted to production of high-class castings.

Overhead Carrying System. Overhead Carrying System for Modern Foundry, F. H. Bell. Can. Foundryman, vol. 14, no. 10, Oct. 1923, pp. 13–16, 10 figs. Describes overhead system for conveying molten metal and other material in foundry; saves time and labor, increases production, and makes life easier for workmen.

Steel. Adopts Melting Units to Meet Varied Needs, B. K. Price. Foundry, vol. 51, no. 21, Nov. 1, 1923, pp. 868–872 and 883. Plant of Eastern Steel Castings Co., Newark, N. J., which is largest jobbing foundry in New York metropolitan district and one of few in country producing both electric and open-hearth steel castings.

FREIGHT HANDLING

Containers, Road-Railway. Interchangeable Road-Railway Containers? Motor Transport (Lond.), vol. 37, nos. 969, 970, and 975, Sept. 24, Oct. 1 and Nov. 5, 1923, pp. 384–387, 420–422, 565–566, 38 figs. Discusses question of whether goods containers or bins interchangeable between road and railway vehicles can be standardized, making calculations.

Tractor-Trailer System. Developing Lower Costs for Handling Freight. Ry. Age, vol. 75, no. 17, Oct. 27, 1923, pp. 757–760, 8 figs. Southern Ry. pays for tractor-trailer installation at Pinners Point, Va., out of savings produced.

Transhipment. The Influence of Transhipment on Railborne and Road Traffic, with Special Reference to the Most Economical Methods of Labour-Saving Appliances. Inst. Transport—Jl., vol. 4, no. 7, May 1923, pp. 228–248 and (discussion) 248–253, 15 figs. First article by J. Rostern, on influence of transhipment. Second article, by C. Bentham, on labor-saving appliances, dealing with cranes, runways, hand and power trucks, trailers, continuous conveyors weighing machines and capstans.

FUELS

See COAL; OIL FUEL; PEAT; PULVERIZED COAL.

FURNACES, HEAT-TREATING

Hardening. The New "Ley" Hardening Furnaces, (Der neue "Ley"-Härteofen), H. Engel. Motorwagen, vol. 26, no. 25, Sept. 10, 1923, pp. 374–376, 5 figs. Describes construction and operation of new furnace,

Manufactured by Advertisers — CLASSIFIED LIST OF MECHANICAL EQUIPMENT — Alphabetical List on page 168

Gears, Cut
* Brown, A. & F. Co.
Chain Belt Co.
* De Laval Steam Turbine Co.
Farrel Foundry & Machine Co.
* Fawcus Machine Co.
* Foote Bros. Gear & Machine Co.
* James, D. O. Mfg. Co.
Johnson, Carlyle Machine Co.
* Jones, W. A. Fdry. & Mach. Co.
Link-Belt Co.
Mackintosh-Hemphill Co.
* Medart Co.
Northern Engineering Works
Philadelphia Gear Works

Gears, Fibre
* General Electric Co.
* James, D. O. Mfg. Co.

Gears, Grinding
Farrel Foundry & Machine Co.

Gears, Helical
Farrel Foundry& Machine Co.

Gears, Herringbone
* Falk Corporation
Farrel Foundry & Machine Co.
* Fawcus Machine Co.

Gears, Machine Molded
* Brown, A. & F. Co
Farrel Foundry & Machine Co.
* Jones, W. A. Fdry. & Mach. Co
Link-Belt Co.

Gears, Rawhide
Farrel Foundry & Machine Co.
Ganschow, Wm. Co.
* James, D. O. Mfg. Co.
Philadelphia Gear Works

Gears, Speed Reduction
Chain Belt Co.
* De Laval Steam Turbine Co.
* Falk Corporation
Farrel Foundry & Machine Co.
* Fawcus Machine Co.
* Foote Bros. Gear & Machine Co.
Ganschow, Wm. Co.
* General Electric Co.
* James, D. O. Mfg. Co.
* Jones, W. A. Fdry. & Mach. Co.
* Kerr Turbine Co.
Link-Belt Co.
* Sturtevant, B. F. Co.
* Westinghouse Electric & Mfg. Co.

Gears, Worm
Chain Belt Co.
* Cleveland Worm & Gear Co.
* Fawcus Machine Co.
* Foote Bros. Gear & Machine Co.
Ganschow, Mm. Co.
* Gifford-Wood Co.
* James, D. O. Mfg. Co.
* Jones, W. A. Fdry. & Mach. Co.
Link-Belt Co.

Generator Cooling Systems
* Atmospheric Conditioning Corp'n

Generating Sets
* Allis-Chalmers Mfg. Co.
* American Blower Co.
* Clarage Fan Co.
* De Laval Steam Turbine Co.
* Engberg's Electric & Mech. Wks.
* General Electric Co.
* Kerr Turbine Co.
* Sturtevant, B. F. Co.
* Westinghouse Electric & Mfg. Co.

Generators, Electric
* Allis-Chalmers Mfg. Co.
* De Laval Steam Turbine Co.
* Engberg's Electric & Mech. Wks.
* General Electric Co.
* Nordberg Mfg. Co.
Ridgway Dynamo & Engine Co.
* Westinghouse Electric & Mfg. Co.

Governors, Air Compressor
* Foster Engineering Co.

Governors, Engine, Gas
* Massey Machine Co.

Governors, Engine, Oil
* Massey Machine Co.
* Nordberg Mfg. Co.

Governors, Engine, Steam
* Massey Machine Co.
* Nordberg Mfg. Co.

Governors, Gas
Equitable Meter Co.

Governors, Oil Burner
* Foster Engineering Co.

Governors, Pressure
* Tagliabue, C. J. Mfg. Co.

Governors, Pump
* Bowser, S. F. & Co. (Inc.)
* Davis, G. M. Regulator Co.
* Edward Valve & Mfg. Co
* Foster Engineering Co.
* Kieley & Mueller (Inc.)
Squires, C. E. Co.
* Tagliabue, C. J. Mfg. Co.

Governors, Steam Turbine
* Foster Engineering Co.
* Massey Machine Co.

Governors, Water Wheel
* Worthington Pump & Machinery Corp'n

Granulators
* Smidth, F. L. & Co.

Graphite, Flake (Lubricating)
* Dixon, Joseph Crucible Co.

Grate Bars
* Casey-Hedges Co.
* Combustion Engineering Corp'n
* Erie City Iron Works
* Titusville Iron Works Co.
* Vogt, Henry Machine Co.

Grate Bars (for Overfeed and Underfeed Stokers)
Furnace Engineering Co.

Grates, Dumping
* Brownell Co.
* Combustion Engineering Corp'n
* Frost Mfg. Co.
* Titusville Iron Works Co.
* Vogt, Henry Machine Co.

Grates, Rocking
* Brownell Co.

Grates, Shaking
* Brownell Co.
* Casey-Hedges Co.
* Combustion Engineering Corp'n
* Erie City Iron Works
* Frost Mfg. Co.
* Springfield Boiler Co.
* Titusville Iron Works Co.
* Vogt, Henry Machine Co.

Grating, Flooring
* Irving Iron Works Co.

Grease Cups
(See Oil and Grease Cups)

Grease Extractors
(See Separators, Oil)

Greases
* Dixon, Joseph Crucible Co.
* Royersford Fdry. & Mach. Co.
Vacuum Oil Co.

Grinders, Saw
Machinery Co. of America

Grinding Machinery
* Brown, A. & F. Co.
* Smidth, F. L. & Co.

Grinding Machines, Chaser
* Landis Machine Co. (Inc.)

Grinding Machines, Floor
* Builders Iron Foundry
* Royersford Fdry. & Mach. Co.

Grinding Machinery, Knife
* American Machine & Foundry Co.

Grinding Machines, Tool
Machinery Co. of America

Grinding Wheel Dressers
Machinery Co. of America

Guards (Electric Lamp)
Flexible Steel Lacing Co.

Gun Metal Finish
* American Metal Treatment Co.

Hammers, Drop
* Franklin Machine Co.
* Long & Allstatter Co.

Hammers, Pneumatic
* Ingersoll-Rand Co.

Hangers, Shaft
* Brown, A. & F. Co.
* Chain Belt Co.
* Falls Clutch & Machinery Co.
* Jones, W. A. Fdry. & Mach. Co.
Link-Belt Co.
* Medart Co.
* Royersford Fdry. & Mach. Co.
* Wood's, T. B. Sons Co.

Hangers, Shaft (Ball Bearing)
* Hyatt Roller Bearing Co.
* S K F Industries (Inc.)

Hangers, Shaft (Roller Bearing)
* Hyatt Roller Bearing Co.
* Jones, W. A. Fdry. & Mach. Co.

Hard Rubber Products
* United States Rubber Co.

Hardening
* American Metal Treatment Co.

Headers, Welded
Kellogg, M. W. Co.

Heat Exchangers
* Croll-Reynolds Engineering Co.

Heat Treating
* American Metal Treatment Co.

Heaters, Feed Water (Closed)
* Brownell Co.
* Croll-Reynolds Engineering Co.
* Erie City Iron Works
* Frost Mfg. Co.
* Schutte & Koerting Co.
* Walsh & Weidner Boiler Co.
* Wheeler, C. H. Mfg. Co.
* Wheeler Cond. & Engrg. Co.
* Worthington Pump & Machinery Corp'n

Heaters, Feed Water, Locomotive (Open)
* Worthington Pump & Machinery Corp'n

Heaters, Water Supply
Herbert Boiler Co.

Heaters and Purifiers, Feed Water (Open)
* Brownell Co.
Elliott Co.
* Erie City Iron Works
* Frost Mfg. Co.
* H. S. B. W.-Cochrane Corp'n
Hoppes Mfg. Co.
* Springfield Boiler Co.
* Wickes Boiler Co.
* Worthington Pump & Machinery Corp'n

Heaters and Purifiers, Feed Water, Metering
* H. S. B. W.-Cochrane Corp'n

Heating and Ventilating Apparatus
* American Blower Co.
* American Radiator Co.
* Clarage Fan Co.
* Sturtevant, B. F. Co.

Heating Specialties
* Foster Engineering Co.
* Fulton Co.

Heating Specialties, Vacuum
* Foster Engineering Co.

Hoisting and Conveying Machinery
* Brown Hoisting Machinery Co.
Chain Belt Co.
Clyde Iron Works Sales Co.
* Gifford-Wood Co.
* Jones, W. A. Fdry. & Mach. Co.
Lidgerwood Mfg. Co.
Link-Belt Co.
Northern Engineering Works

Hoists, Air
* Ingersoll-Rand Co.
* Nordberg Mfg. Co.
Northern Engineering Works
* Whiting Corp'n

Hoists, Belt
Clyde Iron Works Sales Co.
Lidgerwood Mfg. Co.

Hoists, Chain
Northern Engineering Works
Reading Chain & Block Corp'n
* Yale & Towne Mfg. Co.

Hoists, Electric
* Allis-Chalmers Mfg. Co.
* American Engineering Co.
* Brown Hoisting Machinery Co.
Clyde Iron Works Sales Co.
* Elwell-Parker Electric Co.
* General Electric Co.
Lidgerwood Mfg. Co.
Link-Belt Co.
* Nordberg Mfg. Co.
Northern Engineering Works
Reading Chain & Block Corp'n
* Yale & Towne Mfg. Co.

Hoists, Gas and Gasoline
Lidgerwood Mfg. Co.

Hoists, Head Gate
Smith, S. Morgan Co.

Hoists, Locomotive & Coach
* Whiting Corp'n

Hoists, Mine
Lidgerwood Mfg. Co.
* Nordberg Mfg. Co.

Hoists, Skip
* Brown Hoisting Machinery Co.
Lidgerwood Mfg. Co.
Link-Belt Co.

Hoists, Sluice Gate
Philips & Davies

Hoists, Steam
(See Engines, Hoisting)

Holders, Nipple
* Curtis & Curtis Co.

Hose, Acid
* United States Rubber Co.

Hose, Air and Gas
* Goodrich, B. F. Rubber Co.
* United States Rubber Co.

Hose, Fire
* United States Rubber Co.

Hose, Gas
* United States Rubber Co.

Hose, Gasoline
* Goodrich, B. F. Rubber Co.
* United States Rubber Co.

Hose, Metal, Flexible
Johns-Manville (Inc.)

Hose, Oil
* United States Rubber Co.

Hose, Rubber
* Goodrich, B. F. Rubber Co.
* United States Rubber Co.

Hose, Steam
* United States Rubber Co.

Hose, Suction
* United States Rubber Co.

Humidifiers
* American Blower Co.
* Atmospheric Conditioning Corp'n
* Carrier Engineering Corp'n
* Sturtevant, B. F. Co.

Humidity Control
* Atmospheric Conditioning Corp'n
* American Blower Co.
* Carrier Engineering Corp'n
* Sturtevant, B. F. Co.
* Tagliabue, C. J. Mfg. Co.

Hydrants, Fire
Kennedy Valve Mfg. Co.
* Reading Steel Casting Co. (Inc.)
(Pratt & Cady Division)
* Worthington Pump & Machinery Corp'n

Hydraulic Machinery
* Allis-Chalmers Mfg. Co.
* Ingersoll-Rand Co.
Mackintosh-Hemphill Co.
* Worthington Pump & Machinery Corp'n

Hydraulic Press Control Systems (Oil Pressure)
* American Fluid Motors Co.

Hydrokineters
* Schutte & Koerting Co.

Hydrometers
* Tagliabue, C. J. Mfg. Co.
* Taylor Instrument Cos.

Hygrometers
* Tagliabue, C. J. Mfg. Co.
* Taylor Instrument Cos.
Weber, F. Co. (Inc.)

Ice Making Machinery
* De La Vergne Machine Co.
* Frick Co. (Inc.)
* Ingersoll-Rand Co.
Johns-Manville (Inc.)
* Nordberg Mfg. Co.
* Vilter Mfg. Co.
* Vogt, Henry Machine Co.

Ice Tools
* Gifford-Wood Co.

Idlers, Belt
* Smidth, F. L. & Co.

Indicator Posts
* Crane Co.
Kennedy Valve Mfg. Co.
* Reading Steel Casting Co. (Inc.)
(Pratt & Cady Division)

Indicators, CO
* Uehling Instrument Co.

Indicators, CO_2
Bacharach Industrial Instrument Co.
* Uehling Instrument Co.

Indicators, Engine
* American Schaeffer & Budenberg Corp'n
Bacharach Industrial Instrument Co.
* Crosby Steam Gage & Valve Co.

Indicators Sight Flow
* Bowser, S. F. & Co. (Inc.)

Indicators, SO_2
* Uehling Instrument Co.

Indicators, Speed
* American Schaeffer & Budenberg Corp'n
Veeder Mfg. Co.
Weston Electrical Instrument Co.

Injectors
* Schutte & Koerting Co.

Injectors, Air
* Croll-Reynolds Engrg. Co.

Instruments, Electrical Measuring
* General Electric Co.
* Taylor Instrument Cos.
* Westinghouse Electric & Mfg. Co.
Weston Electrical Instrument Co.

Instruments, Hardening Measuring
* Olsen, Tinius Testing Machine Co.

Instruments, Oil Testing
* Tagliabue, C. J. Mfg. Co.

Instrument, Recording
* American Schaeffer & Budenberg Corp'n
* Ashton Valve Co.
Bacharach Industrial Instrument Co.
* Baily Meter Co.
* Bristol Co.

*Catalogue data of firms marked * appear in the A.S.M.E. Condensed Catalogues of Mechanical Equipment, 1923-24 Volume*

consisting of number of muffles of different temperature requirement combined in one unit.

Types. A Day at the Ford Plant, W. Trinks. Fuels & Furnaces, vol. 1, no. 6, Oct. 1923, pp. 411–414, 460, 462, 464 and 466–468, 7 figs. Discusses salient features of the various types of furnaces in operation at Highland Park plant; producer gas is main fuel; describes Smith gas producers used.

G

GAGES

Holes, Locating. The Positioning of Holes for Gauge or Jig Work, E. W. Eager. Mech. World, vol. 74, nos. 1918 and 1919, Oct. 5 and 19, 1923, pp. 206–208 and 238–239, 6 figs. Describes methods for locating holes on a flat surface.

GALVANIZING

Anglo Process. Anglo Process of Galvanising. Iron & Coal Trades Rev., vol. 107, no. 2904, Oct. 26, 1923, p. 623. Hot-process methods of galvanizing; describes Anglo process, a new cold process of galvanizing iron and steel, which appears definitely to solve problem of galvanization by giving iron and steel surfaces a thoroughly efficient coating of zinc.

Galvannealing Method. A New Process of Coating Metals. Sheet Metal Worker, vol. 14, no. 20, Oct. 26, 1923, p. 760, 4 figs. Describes galvannealing method which gives longer protection against rust.

GAS ENGINES

Large. High-Power Gas Engines (Hochleistungs-Grossgasmaschinen), Ernst Immerschitt. Wärme- u. Kälte-Technik, vol. 25, nos. 20 and 21, Oct. 20 and Nov. 1, 1923, pp. 157–159 and 167–169, 9 figs. Means of increasing efficiency of large gas engines; gas engines with scavenging and auxiliary charge; design, operation and economic advantages.

Large Gas Engines. Practical Engr., vol. 68, nos. 1908, 1909, 1910, 1911 and 1912, Sept. 20, 27, Oct. 4, 11 and 18, 1923, pp. 157–159, 178–180, 192, 207–209 and 216–219, 13 figs. Describes various types of multi-cylinder vertical engines; producer gas for power; blast-furnace gas engines.

Winkler-Klein. Double Piston Two-Stroke Gas Engine, Type Winkler-Klein. Eng. Progress, vol. 4, no. 9, Sept. 1923, pp. 195–196, 2 figs. Describes engine designed by Maschinenbau A.-G. vorm. Gbr. Klein of Dahlbruch, which operates according to Körting principle, i.e., double effective two-stroke method.

GAS PRODUCERS

Central Type. Performance and Grate Tests on Inclined-Retort Batteries Heated with Central-Producer Gas (Leistungs- und Unterfeuerungsversuche an fremdgasbeheizten Schrägofenbatterien), E. Schumacher. Gas- u. Wasserfach, vol. 66, no. 35, Sept. 1, 1923, pp. 524–526. Results of tests in Frankfurt gas works on two new installations of highly refractory material with gas heating supplied from a central producer plant; coke and coal analysis; advantages of central-type producers.

GEAR CUTTING

Bevel Gears. Straight Bevel Gear Generator Is Designed for Mass Production. Automotive Industries, vol. 49, no. 19, Nov. 8, 1923, pp. 958–959, 1 fig. Single-purpose machine brought out by Gleason Works increases speed of manufacture.

Hobbing Machine. New Gear Hobbing Machine. Iron Age, vol. 112, no. 17, Oct. 25, 1923, pp. 1115–1116, 5 fig. Machine for accurate hobbing of spur and spiral gears developed by Brown & Sharpe Mfg. Co.

GEARS

Bevel. Spiral Bevel Gears Which Can Be Hobbed, Nikola Trbojevich. Am. Mach., vol. 59, no. 18, Nov. 1, 1923, pp. 647–652, 8 figs. New theory of bevel gearing; how tapered hob can be employed; method of determing action of gearing.

GRINDING

Cylindrical Production. Development in Production Grinding in the Automotive Industry, Oscar A. Knight. Soc. Automotive Engrs.—Jl., vol. 13, no. 5, Nov. 1923, pp. 387–392, 15 figs. Details of new attachments, mechanisms and grinding machines; author points out importance of quality product to serve needs of automotive industry adequately.

Dust Inhalation. Grinding Processes and Dust Inhalation, E. L. Macklin and E. L. Middleton. Quarry & Surveyors' & Contractors' Jl., vol. 28, no. 319, Sept. 1923, pp. 248–250. Abstract of report on grinding of metals and cleaning of castings with special reference to effects of dust inhalation upon workers, issued by Brit. Home Office.

Steel Castings. Steel Casting Grinding Practice, Herbert R. Simonds. Abrasive Industry, vol. 4, no. 11, Nov. 1923, pp. 318–320, 4 figs. Selection of wheels; use of goggles and wheel guards; correct wheel speeds essential.

GRINDING MACHINES

Spur-Gear. Spur-Gear Grinding and Testing, A. J. Ott and C. L. Ott. Soc. Automotive Engrs.—Jl., vol. 13, no. 5, Nov. 1923, pp. 401–406, 19 figs. Grinding machine for finishing spur gears which, it is claimed, will grind transmission gears on production bases after they have been heat treated, will produce correct tooth contour, smooth finish, and accurate tooth spacing; also describes machine for testing gears that have been ground.

H

HACK-SAWING MACHINES

Developments. Developments in Power Hacksaw Blades and Machines. Machy. (Lond.), vol. 23, no. 577, Oct. 18, 1923, pp. 65–69, 9 figs. Describes new type of saw blade with specially set tooth patented by A. H. Evans; sharpening machine for reconditioning blades, and sawing machine suitably adapted to run at high speeds under more severe conditions required to obtain maximum advantages from new blades.

HANDLING MATERIALS

Foundries. A Cost Comparison in Handling Materials, Shellman B. Brown. Management & Administration, vol. 6, no. 5, Nov. 1923, pp. 611–616, 6 figs. Mechanical equipment contrasted with hand labor at Warren Foundry & Pipe Co.

HANGARS

German System. Modern Airplane Hangars (Neuzeitliche Hallen für Flugzeuge), H. Sattler. Zeit. für Flugtechnik u. Motorluftschiffahrt, vol. 14, no. 15–16, Aug. 31, 1923, pp. 127–128, 2 figs. Describes new construction system with wooden segment roof, developed in Germany.

HARDNESS

Ball Hardness Testing. Brinell Hardness Tests. Practical Engr., vol. 68, nos. 1909 and 1910, Sept. 27 and Oct. 4, 1923, pp. 175–176 and 185–187, 3 figs. Ball-indentation principle of comparing hardness of metals. Formulas and calculations.

Scleroscope, Application of. The Standardization of Methods of Applying the Scleroscope, A. F. Shore. Soc. Automotive Engrs.—Jl., vol. 13, no. 5, Nov. 1923, pp. 409–416, 16 figs. Statement of nine items suggested by Iron and Steel Division of Society for consideration with reference to securing greater uniformity in practice when making precision hardness tests with scleroscope; comparison between Brinell and scleroscope hardness testing.

Testers. Hardness Tester on the Rebound Principle, H. Degen. Eng. Progress, vol. 4, no. 9, Sept. 1923, pp. 193–195, 7 figs. Design and performance; Shore's hardness index; examples of application of hardness tester on rebound principle.

HEAT

Conservation. Practical Work in the Field of Heat Conservation (Praktische Arbeit auf dem Gebiete der Wärmewirtsehaft), H. Reutlinger. Archiv für Wärmewirtschaft, vol. 4, no. 10, Oct. 1923, pp. 181–187, 8 figs. Notes on waste-steam utilization in a textile and in a paper mill; heat-economical improvements in a dye factory; improvement in production machines; reconstruction of hot-air plant in a dye factory; waste heat utilization in a large ceramic plant.

HEAT TRANSMISSION

Cylinders. Heat Migration in Cylinders from Homogeneous Heat Conductors (Wärmewanderung in Zylindern aus homogenen Wärmeleitern), Ernst Oelschläger. Wissenschaftliche Veröffentlichungen aus dem Siemens-Konzern, vol. 3, no. 1, May 15, 1923, pp. 29–40, 5 figs. Describes approximate method for calculation of temperature in relation to time, in long cylindrical bodies, when these are heated internally or externally.

HEATING, ELECTRIC

Dwellings. Facts About Electric Heating, M. P. Whelen. Elec. News, vol. 32, no. 18, Sept. 15, 1923, pp. 78–80, 3 figs. Results of special research on application of electrical heating systems to dwellings; sizes of units; energy required; cost of installation; limiting factors.

HEATING, GAS

Experiments. The Denver Residence Gas-Heating Experiment, T. M. Foulk and T. G. Storey. Heat. & Vent. Mag., vol. 20, no. 10, Oct. 1923, pp. 37–43, 11 figs. Detailed report of conditions under which this program, inaugurated by Denver Gas & Elec. Light Co., is being conducted, methods and experience relative to installations, and economic results obtained.

Industrial. Industrial Gas Heating (Ausgewählte Kapitel aus dem Gebiete der gewerblichen Gasfeuer), H. Albrecht. Gas- u. Wasserfach, vol. 66, no. 24, June 16, 1923, pp. 346–353, 9 figs. Deals with following problems: Fixing price of gas to compete with price of coal firing; low-pressure gas, compressed air, and compressed gas; removal of exhaust gases; heat losses, their prevention and recovery.

HEATING, STEAM

Central-Station. Analysis of Some Central Station Heating Plant Problems. Mun. & Country Eng., vol. 65, no. 3, Sept. 1923, pp. 101–107. Growth of central-station heating; advantages to consumer; advantages of steam; factors affecting success; location of plant relative to water and coal supply; design and equipment of plant; data on Minnesota plants.

The New Central Heating Plant of Queen's University and Kingston General Hospital, L. M. Arkley and W. P. Wilgar. Eng. Jl., vol. 6, no. 11, Nov. 1923, pp. 475–483, 12 figs. Design and equipment of plant in which existing equipment was used wherever practicable.

Community or Group. Facts and Figures on Community or Group Heating, H. C. Kimbrough. Mun. & County Eng., vol. 65, no. 4, Oct. 1923, pp. 146–148. Investigation of engineering and commercial factors. Data on cost of construction and operation of single unit, or block plant, consisting of 42 residences, 4 apartment buildings, 1 club and 9 garages.

Counterflowing Condensate. Critical Velocity of Steam with Counter-Flowing Condensate, William A. Pearl and Eri B. Parker. Heat. & Vent. Mag., vol. 20, no. 10, Oct. 1923, pp. 46–49, 3 figs. Practical data secured through recent tests for solving problems where flow of condensation is counter to steam flow. From Eng. Bul. No. 13 issued by State College of Wash. Experiment Station.

HOBS

Gear-Cutting. Making Hobs for Cutting the Teeth of Gears, Ellsworth Sheldon. Am. Mach., vol. 59, no. 17, Oct. 25, 1923, pp. 623–627, 10 figs. Describes manufacturing operations involved.

HYDRAULIC TURBINES

Draft Tubes. Comparative Tests on Experimental Draft-Tubes, C. M. Allen and I. A. Winter. Am. Soc. Civ. Engrs.—Proc., vol. 49, no. 9, Nov. 1923, pp. 1813–1845, 29 figs. Results of tests made at Alden Hydraulic Laboratory on 12 model draft tubes, to determine relative efficiencies of draft tubes of different types under hydraulic conditions existing at 120,000-hp. hydroelectric power plant under construction.

Economic Operation. Economical Operation of Hydraulic Turbines, Amory R. Haynes. Elec. Light & Power, vol. 1, no. 10, Oct. 1923, pp. 19–21, 50–52 and 54–55, 6 figs. Discussion of economical use of water in a station, and features of system operation affecting best internal economy; test data.

Flume Calculation. Hydraulic Calculation of Flumes (Hydraulisk beräkning av flottningsrännor), Fredrick Jonson. Teknisk Tidskrift, vol. 53, no. 17, Apr. 28, 1923, pp. (Vägoch Vattenbyggnadskonst) 37–41, 4 figs. Formulas and calculations for flumes of turbines of hydroelectric plants, and examples of application.

Kaplan High-Speed. European Development in High-Speed Hydraulic Turbines, Elov Englesson. Power, vol. 58, no. 20, Nov. 13, 1923, pp. 758–760, 10 figs. Kaplan-type turbines designed with movable blades to be adjusted for different load conditions, which improve part-load efficiencies; 11,200-hp. turbine of this type under construction in Sweden to operate under 21.25 ft. head and run at 62.5 r.p.m.; runner is 19 ft. in diam. and weighs 62.5 tons.

Racing. Protection Against the Racing of Hydraulic Turbines (Schutz gegen das Durchgehen von Wasserturbinen), C. Reindl. Elektrotechnik u. Maschinenbau, vol. 41, nos. 39 and 40, Sept. 30 and Oct. 7, 1923, pp. 566–571 and 582–586, 10 figs. Investigation of influence of different protective arrangements, influence of flywheel moment, and water content of turbine chamber and pipe line on increase in speed.

Reaction in. A Study of Irregularity of Reaction in Francis Turbines, Roy Wilkins. Am. Inst. Elec. Engrs.—Jl., vol. 42, no. 11, Nov. 1923, pp. 1141–1144, 14 figs. Describes successful method of study of such phenomena as vibration caused by irregularity of reaction manifesting itself in several impulses per second.

HYDROELECTRIC DEVELOPMENTS

Augusta, Ga., Project. Proposed Electrification of the Augusta, Georgia, Power Canal, Nisbet Wingfield. Mun. & County Eng., vol. 65, no. 3, Sept. 1923, pp. 121–126. Present sources of power; how additional power can be obtained; possible sites for hydroelectric development; proposed development.

Sweden. Water-Power Development in Sweden, W. Borgquist. Elec. World, vol. 82, no. 17, Oct. 27, 1923, pp. 850–855, 11 figs. Far-flung system of low-head plants extending to Artic circle is fast being interconnected into one great group; how hydroelectricity is supplemented by steam.

HYDROELECTRIC PLANTS

California. Recent Hydroelectric Developments of Southern California Edison Company, H. L. Doolittle. Am. Inst. Elec. Engrs.—Jl., vol. 42, no. 11, Nov. 1923, pp. 1132–1133. Details of Kern River and Big Creek power plants; installation of venturi meters; draft tubes; impulse wheels; and rubber seal rings.

Canada. Hydro Development at Chute Des Galets, Hector Cimon. Can. Engr., vol. 45, no. 14, Oct. 2, 1923, pp. 361–362, 4 figs. Describes hydroelectric plant on Shipshaw river built to supply power to paper mill at Kenogami, Que.; concrete dam and power house; two vertical turbines direct-connected to 8000-kva. generators.

Washington. Upper Falls Development of The Washington Water Power Company in Spokane, Wash., L. J. Pospisil. Am. Inst. Elec. Engrs.—Jl., vol. 42, no. 11, Nov. 1923, pp. 1133–1140, 6 figs. Describes hydroelectric development in center of city having single vertical-shaft generator and delivering its output to buses of existing distribution substation 350 ft. distant, excitation and load control of new generator being from substation.

I

ICE MANUFACTURE

Methods. New Ice Making System, H. T. Simpson. Ice & Refrigeration, vol. 65, no. 4, Oct. 1923, pp. 180–182, 4 figs. Describes ice-making equipment of Fox Ice Co., Racine, Wis.; method of harvesting ice; methods of filling cans; treatment of crushed ice in cores.

ICE PLANTS

Electrically Operated. Electrically Driven Ice-Making Plant. Ice & Cold Storage, vol. 26, no. 306, Sept. 1923, pp. 211–212, 4 figs. Details of installation consisting of two separate and independent units, each capable of producing 75 tons of ice per day.

Pittsburgh, Pa. Modern Plant of the North Pole Ice Co., Pittsburgh, Pa. Refrigeration, vol. 33, no. 7,

Manufactured by Advertisers

CLASSIFIED LIST OF MECHANICAL EQUIPMENT

Alphabetical List on page 168

* Builders Iron Foundry
* Crosby Steam Gage & Valve Co.
* General Electric Co.
* Tagliabue, C. J. Mfg. Co.
* Taylor Instrument Cos.
* Uehling Instrument Co.
* Westinghouse Electric & Mfg. Co.

Instruments, Scientific
* Taylor Instrument Cos.
Weber, F. Co. (Inc.)

Instrument, Surveying
Dietzgen, Eugene Co.
Keuffel & Esser Co.
ParVell Laboratories
Weber, F. Co. (Inc.)

nsulating Materials (Electrical)
* General Electric Co.
Johns-Manville (Inc.)

Insulating Materials (Heat and Cold)
* Celite Products Co.
Johns-Manville (Inc.)
* King Refractories Co. (Inc.)
* Quigley Furnace Specialties Co.

Irrigation Systems
* Spray Engineering Co.

Joints, Expansion
* Crane Co.
* Croll-Reynolds Engineering Co.
Hamilton Copper & Brass Works
Lunkenheimer Co.
* Pittsburgh Valve, Fdry. & Const. Co.
* United States Rubber Co.
* Wheeler, C. H. Mfg. Co.

Joints, Flauged Pipe
* Crane Co.
* Pittsburgh Valve, Fdry. & Const. Co.

Joints, Flexible
* Barco Mfg. Co.

Joints, Swing and Swivel
* Barco Mfg. Co.
Lunkenheimer Co.

Kettles, Soda
Manufacturing Equipment & Engrg. Co.

Kettles, Steam Jacketed
* Cole, R. D. Mfg. Co.
* Nordberg Mfg. Co.
* Titusville Iron Works Co.

Keys, Machine
* Smith & Serrell
* Whitney Mfg. Co.

Keyseating Machines
* Whitney Mfg. Co.

Kilns, Dry (Brick, Lumber, Stone, etc.)
* American Blower Co.
* Sturtevant, B. F. Co.

Ladles
Northern Engineering Works
* Whiting Corp'n

Lamp Protectors
Flexible Steel Lacing Co.

Lamps, Incandescent
* General Electric Co.
Johns-Manville (Inc.)
* Westinghouse Electric & Mfg. Co.

Land-Clearing Machinery
Clyde Iron Works Sales Co.

Lathe Attachments, Pipe-Threading
* Curtis & Curtis Co.

Lathes, Automatic
* Jones & Lamson Machine Co.

Lathes, Brass
* Warner & Swasey Co.

Lathes, Chucking
* Jones & Lamson Machine Co.

Lathes, Engine
* Builders Iron Foundry

Lathes, Turret
* Jones & Lamson Machine Co.
* Warner & Swasey Co.

Levers, Flexible (Wire)
* Gwilliam Co.

Linings, Brake
Johns-Manville (Inc.)

Linings, Furnace
* Best, W. N. Corp'n
* Celite Products Co.
Johns-Manville (Inc.)
* King Refractories Co. (Inc.)
* McLeod & Henry Co.
* Quigley Furnace Specialties Co.

Linings, Stack
Johns-Manville (Inc.)

Liquid Fuel Equipment
* Best, W. N. Corp'n

Loaders, Portable
* Gifford-Wood Co.
Link-Belt Co.

Lockers, Metal
Manufacturing Equip. & Engrg. Co.

Locomotives, Electric
* General Electric Co.
* Westinghouse Electric & Mfg. Co.

Locomotives, Storage Battery
* General Electric Co.
* Westinghouse Electric & Mfg. Co.

Logging Machinery
Clyde Iron Works Sales Co.
Lidgerwood Mfg. Co.

Looms
Fletcher Works

Lubricants
* Dixon, Joseph Crucible Co.
* Royersford Fdry. & Mach. Co.
Vacuum Oil Co.

Lubricating Systems
* Bowser, S. F. & Co. (Inc.)
Lunkenheimer Co.

Lubricators, Cylinder
* Bowser, S. F. & Co. (Inc.)
Lunkenheimer Co

Lubricators, Force-Feed
* Bowser, S. F. & Co. (Inc.)
Lunkenheimer Co.

Lubricators, Hydrostatic
* Crosby Steam Gage & Valve Co.
Lunkenheimer Co.

Lubricators (Sight Feed)
* Crosby Steam Gage & Valve Co.
Lunkenheimer Co.

Machine Tool Feed Control Systems (Oil Pressure)
* American Fluid Motors Co.

Machine Work
* American Machine & Foundry Co.
* Brown, A. & F. Co.
* Builders Iron Foundry
DuPont Engineering Co.
Farrel Foundry & Machine Co.
* Franklin Machine Co.
Johnson, Carlyle Machine Co.
* Jones, W. A. Fdry. & Mach. Co.
Lammert & Mann Co.
Link-Belt Co.
* Nordberg Mfg. Co.
Purvis Machine Co.

Machinery
(Is classified under the headings descriptive of character thereof)

Magnesia Products
Carey, Philip Co.

Manometers
Bacharach Industrial Instrument Co.
* Simplex Valve & Meter Co.

Mechanical Draft Apparatus
* American Blower Co.
* Clarage Fan Co.
* Green Fuel Economizer Co.
* Sturtevant, B. F. Co.

Mechanical Stokers
(See Stokers)

Metal Treating
* American Metal Treatment Co.

Metals, Perforated
* Hendrick Mfg. Co.

Metals, Thermostatic
Wilson, H. A. Co.

Meter Provers
Equitable Meter Co.

Meters, Air and Gas
Bacharach Industrial Instrument Co.
* Bailey Meter Co.
* Builders Iron Foundry
* General Electric Co.

Meters, Boiler Performance
* Bailey Meter Co.

Meters, Condensation
* Simplex Valve & Meter Co.

Meters, Electric
* General Electric Co.
* Westinghouse Electric & Mfg. Co.
Weston Electrical Instrument Co.

Meters, Feed Water
* Bailey Meter Co.
* Builders Iron Foundry
* General Electric Co.
* H. S. B. W.-Cochrane Corp'n
Hoppes Mfg. Co.
* Simplex Valve & Meter Co.
* Worthington Pump & Machinery Corp'n

Meters, Flow
Bacharach Industrial Instrument Co.
* Bailey Meter Co.
* General Electric Co.
* H. S. B. W.-Cochrane Corp'n
* Simplex Valve & Meter Co.
* Spray Engineering Co.

Meters, Gas
Equitable Meter Co.

Meters, Oil
* Bowser, S. F. & Co. (Inc.)
* General Electric Co.
* H. S. B. W.-Cochrane Corp'n
* Simplex Valve & Meter Co.
* Worthington Pump & Machinery Corp'n

Meters, Pitot Tube
* American Blower Co.
* Simplex Valve & Meter Co.

Meters, Steam
* Bailey Meter Co.
* Builders Iron Foundry
* General Electric Co.
* H. S. B. W.-Cochrane Corp'n

Meters, V-Notch
* Bailey Meter Co.
* General Electric Co.
* H. S. B. W.-Cochrane Corp'n

Meters, Venturi
* Builders Iron Foundry
* National Meter Co.
* Simplex Valve & Meter Co.

Meters, Water
* General Electric Co.
* H. S. B. W.-Cochrane Corp'n
Hoppes Mfg. Co.
* National Meter Co.
* Simplex Valve & Meter Co.
* Worthington Pump & Machinery Corp'n

Milling Machines, Hand
* Whitney Mfg. Co.

Milling Machines, Keyseat
* Whitney Mfg. Co.

Milling Machines, Plain
* Warner & Swasey Co.

Mills, Ball
* Allis-Chalmers Mfg. Co.
* Fuller-Lehigh Co.
* Smidth, F. L. & Co.
* Worthington Pump & Machinery Corp'n

Mills, Blooming and Slabbing
Mackintosh-Hemphill Co.

Mills, Grinding
Farrel Foundry & Machine Co.
* Smidth, F. L. & Co.

Mills, Sheet and Plate
Mackintosh-Hemphill Co

Mills, Structural, Rail and Bar
Mackintosh-Hemphill Co.

Mills, Tube
* Allis-Chalmers Mfg. Co.
* Smidth, F. L. & Co.
* Worthington Pump & Machinery Corp'n

Mining Machinery
* Allis-Chalmers Mfg. Co.
* General Electric Co.
* Ingersoll-Rand Co.
* Worthington Pump & Machinery Corp'n

Monorail Systems
(See Tramrail Systems, Overhead)

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* Allis-Chalmers Mfg. Co.
* General Electric Co.
Ridgway Dynamo & Engine Co.
* Westinghouse Electric & Mfg. Co.

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* General Electric Co.
Master Electric Co.
* Sturtevant, B. F. Co.
* Westinghouse Electric & Mfg. Co.

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Ridgway Dynamo & Engine Co.

Nipple Threading Machines
* Landis Machine Co. (Inc.)

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* Linde Air Products Co.

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* Spray Engineering Co.

Nozzles, Blast
* Schutte & Koerting Co.

Nozzles, Sand and Air
Lunkenheimer Co.

Nozzles, Spray
* Cooling Tower Co. (Inc.)
* Schutte & Koerting Co.
* Spray Engineering Co.

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Veeder Mfg. Co.

Ohmeters
* General Electric Co.
Weston Electrical Instrument Co.

Oil and Grease Cups
* Bowser, S. F. & Co. (Inc.)
* Crane Co.
Lunkenheimer Co

Oil and Grease Guns
* Royersford Fdry. & Mach. Co.

Oil Burning Equipment
* Best, W. N. Corp'n
* Combustion Engineering Corp'n
Foerst, John & Sons
Improved Equipment Co.
Morse Dry Dock & Repair Co. (Fuel Oil Engrg. Co.)
* Schutte & Koerting Co.

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* Bowser, S. F. & Co. (Inc.)
Nugent, Wm. W. & Co. (Inc.)

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* Worthington Pump & Machinery Corp'n

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* Vogt, Henry Machine Co.

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Nugent, Wm. W. & Co. (Inc.)

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Lunkenheimer Co.
Nugent, Wm. W. & Co. (Inc.)

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Link-Belt Co.

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Oxygen Gas
* Linde Air Products Co.

Packing, Ammonia
France Packing Co.
* Goodrich, B. F. Rubber Co.
* United States Rubber Co.

Packing, Asbestos
* Goodrich, B. F. Rubber Co.
Johns-Manville (Inc.)
Steel Mill Packing Co.

Packing, Hydraulic
France Packing Co.
* Goodrich, B. F. Rubber Co.
Johns-Manville (Inc.)
Steel Mill Packing Co.

Packing, Metallic
France Packing Co.
* Goetze Gasket & Packing Co.
Johns-Manville (Inc.)
Steel Mill Packing Co.

Packing, Rod (Piston and Valve)
France Packing Co.
* Goodrich, B. F. Rubber Co.
* Jenkins Bros.
Johns-Manville (Inc.)
Steel Mill Packing Co.
* United States Rubber Co.

Packing, Rubber
* Goodrich, B. F. Rubber Co.
* Jenkins Bros.
Johns-Manville (Inc.)
* United States Rubber Co.

Packing, Sheet
* Goetze Gasket & Packing Co.
* Goodrich, B. F. Rubber Co.
* Jenkins Bros.
Johns-Manville (Inc.)
Steel Mill Packing Co.
* United States Rubber Co.

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Smooth-On Mfg. Co.

Paint, Metal
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* General Electric Co.
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Dietzgen, Eugene Co.
Keuffel & Esser Co.
ParVell Laboratories
Weber, F. Co. (Inc.)

*Catalogue data of firms marked * appear in the A.S.M.E. Condensed Catalogues of Mechanical Equipment, 1923-24 Volume*

Aug. 1923, pp. 38–43, 8 figs. Cold-storage warehouse contains cooled space of about 2,000,000 cu. ft.; ice-making system has capacity of 320 tons per day; ice-storage rooms have capacity of 20,000 tons ice.

Spray Cooling Equipment. Spray Cooling Equipment for Ice Plants, B. R. Sausen. Refrig. Eng., vol. 10, no. 3, Sept. 1923, pp. 94–95 and (discussion) 95–96. Type, design, size and arrangement of nozzles; type of spray; type and function of louver; etc. This method has low initial and operating cost, practically no maintenance cost and satisfactory cooling effect.

IGNITION

Automobile Engines. Ignition Appliances. Autocar, vol. 51, no. 1461, Oct. 19, 1923, pp. 692b–694, 7 figs. Review of magneto and coil ignition sets now in wide use.

INDUSTRIAL MANAGEMENT

Budgetary Control. The Monthly Financial Budget, Joseph H. Barber. Management & Administration, vol. 6, no. 4, Oct. 1923, pp. 453–457, 1 fig. Budgetary procedure adopted by Walworth Mfg. Co.

Control System. The "Tell-Tale" Control Board, Chester B. Lord. Management & Administration, vol. 6, no. 4, Oct. 1923, pp. 467–472, 7 figs. Describes simple self-contained, kinetic chart capable of indicating simultaneously any or all factors of industrial operation in terms of common denominator, and of indicating selective responsibility in measure that condition of any item demands.

Posting and Using the "Tell-Tale" Control Board, Chester B. Lord. Management & Administration, vol. 6, no. 5, Nov. 1923, pp. 617–621, 3 figs. Shows how facts are posted on control board and how tell-tale indications bring action.

Cost Control. Interpreting Operation to the Directors, Goeffrey C. Brown. Management & Administration, vol. 6, no. 5, Nov. 1923, pp. 593–598, 6 figs. Describes methods employed in New York mirror factory for purpose of presenting data in such a way that picture of month's activity is constantly before management, and easily accessible to board of directors; tables and graphs prepared by planning office in closing the month.

Employee Suggestion System. Workable Employee Suggestion System, L. W. Tomlin. Iron Age, vol. 112, no. 20, Nov. 15, 1923, pp. 1315–1316. Example of sytem which after two years of operation is still marked by active employee participation, with gratifying results to management.

Financial Control. Finance and Common Sense, C. L. Eiermann. Management & Administration, vol. 6, no. 4, Oct. 1923, pp. 487–490. Practical suggestions for proper handling of financial matters, emphasizing particularly necessity of coördinating financial program with sales and production programs.

Planning System. A Workable Planning System for the Moderate Sized Plant, A. F. Erickson. Factory, vol. 31, no. 5, Nov. 1923, pp. 611–612, 4 figs. Basis of system is large planning board provided with horizontal angle pockets for each machine; planning slip used in connection with board is ruled along one side to indicate hours and fractions of hours.

INDUSTRIAL ORGANIZATION

Vertical Combination. The "Vertical Combination" and How It Reduces Distribution Costs, William R. Basset and Johnson Heywood. Indus. Management (N. Y.), vol. 66, no. 5, Nov. 1923, pp. 278–280, 1 fig. Shows why vertical combination—a combination of links in chain from raw material to distributed product—is inevitable development of near future, and outlines possibilities of such combinations.

INDUSTRIAL PLANTS

General Electric Co., Schenectady. Extreme Variety Versus Standardization, John H. Van Deventer. Indus. Management (N. Y.), vol. 66, no. 5, Nov. 1923, pp. 253–264, 19 figs. partly on supp. plate. Production problems of Gen. Elec. Co. The Schenectady works.

INDUSTRIAL TRUCKS

Electric Lift. New Low Type Electric Lift Truck. Pac. Mar. Rev., vol. 20, no. 11, Nov. 1923, p. 529. Truck developed by L. I. Parker Elec. Co., with power lift which may be used with same platforms as ordinary hand-lift truck.

INTERNAL-COMBUSTION ENGINES

British Types. The Shipping, Engineering and Machinery Exhibition. Automobile Engr., vol. 13, no. 181, Oct. 1923, pp. 308–315, 20 figs. Description of British internal-combustion-engine section.

Friction Losses. Influence of Speed and Temperature on Friction Losses in Internal-Combustion Engines (Influence de la vitesse et de la température sur les pertes par frottements dans les moteurs à explosions), Andre Planiol. Académie des Sciences—Comptes Rendus des Séances, vol. 176, no. 16, Apr. 16, 1923, pp. 1044–1047, 2 figs. Results and deductions from experiments made on a single-cylinder 4-stroke gas engine, 30 hp., 200 r.p.m., 290-mm. bore, 430-mm. stroke, on town gas with volumetric compression 7.0.

Heat Transmission in. Heat Transmission in Internal-Combustion Engines (Der Wärmeübergang in der Verbrennungskraftmaschine), Wilhelm Nusselt. Zeit. des Vereines deutscher Ingenieure, vol. 67, nos. 28 and 29, July 14 and 21, pp. 692–695 and 708–711, 6 figs. Study of cooling of hot combustion gases, based on explosion tests in spherical bombs; formulas for heat-transmission coefficients; equation for calculation of heat exchange between gas and wall in internal combustion engine.

[See also AIRPLANE ENGINES; AUTOMOBILE ENGINES; DIESEL ENGINES; GAS ENGINES; OIL ENGINES; SEMI-DIESEL ENGINES.]

IRON CASTINGS

Separation under Solidification. Separation Phenomena in Castings (Entmischungserscheinungen an Gussstücken), Reinh. Kühnel. Giesserei-Zeitung, vol. 20, no. 21, Oct. 1, 1923, pp. 407–411, 6 figs. Mixture of layers; mixture of zones; causes of zone separation; influence of contraction; practical examples; experimental results.

IRON FOUNDING

Casting-On to Metal. Casting-On to Metal, etc., in Foundry Work, Walter J. May. English Mechanics & World of Sci., vol. 118, no. 3056, Oct. 19 1923, pp. 162–163, 4 figs. Informative account of modern foundry methods.

IRON, PIG

Mixers. Temperature Changes in Thomas Pig Iron on the Way from Blast Furnace to Converter (Die Temperaturveränderungen des Thomasroheisens auf dem Wege von Hochofen zur Birne), E. Septzler. Stahl u. Eisen, vol. 43, no. 42, Oct. 18, 1923, pp. 1315–1321 and (discussion) 3121–1322, 6 figs. Describes mixer plant in steel works at Rheinhausen, Germany; temperature losses of pig iron for blast-furnace tapping to converter; reduction of heat losses of mixer through insulation; tests with one-mixer and two-mixer practice and results.

L

LABOR

Wages and Hours. Wages and Hours of Labor. Monthly Labor Rev., vol. 17, no. 4, Oct. 1923, pp. 59–69. Wages and hours of labor in foundries and machine shops, 1923; schedule of wages for civil employees under naval establishment; English factory hours and two-shift system for women, etc.

LABORATORIES

Foundry. Designing and Equipping a Foundry Laboratory, H. H. Shepherd. Foundry Trade Jl., vol. 28, nos. 373, 374 and 375, Oct. 11, 18 and 25, 1923, pp. 305–307, 334–337 and 352–353, 16 figs. Status of laboratory; site; building; furnishing; balance room; chemical laboratory; titrating bench; fume cupboards; physical laboratory; microscope and dark room; bench considerations; lighting, heating and ventilation; estimated cost.

LADLES

Geared. Geared Crane Foundry Ladles, M. Wise. Mech. World, vol. 74, no. 1922, Nov. 2, 1923, pp. 276–277, 6 figs. Details of design.

LATHES

Relieving. Machine for Backing Off Straight and Spirally Grooved Cutting Tools (Maschine zum Hinterdrehen von gerade- und spiralgenuteten Schneidwerkzeugen), G. Lupberger. Werkstattstechnik, vol. 17, no. 18, Sept. 15, 1923, pp. 549–553, 7 figs. Describes universal relieving lathe which can also be used for grinding worms and threads, and as an ordinary lathe.

Turret. Modern Turret Lathe Refinements, E. W. Field. British Machine Tool Eng., vol. 2, no. 23, Sept.-Oct. 1923, pp. 688–691 and 712, 6 figs. Describes developments.

LIGHTING

Progress 1922–1923. The Year's Progress in Illumination 1922–1923. Illuminating Eng. Soc.—Trans., vol. 18, no. 7, Sept. 1923, pp. 583–678. Report of committee on progress. Deals with gas, incandescent electric lamps, arc and vapor tube lamps, lamps for projection purposes, street lighting and other exterior illumination, interior illumination, luminaires, photometry, physics, physiology, illuminating engineering. Bibliography.

Railway. Report of Committee (Assn. Ry. Elec. Engrs.) on Illumination. Ry. Elec. Engr., vol. 14, no. 11, Nov. 1923, pp. 361–367, 5 figs. Review of development in incandescent lamp and illumination fields that are of interest to railway electrical engineers; changes in industrial lighting codes; diversity of opinion as to how flood lighting should be applied.

LOCOMOTIVES

Austrian. Austrian Steam Locomotives (Die österreichischen Dampflokomotiven), H. Baecker. Glasers Annalen, vol. 92, nos. 4, 10 and 11, Feb. 15, May 15 and June 1, 1923, pp. 55–60, 139–143 and 147–151, 15 figs., Feb. 15: Locomotives with 4 and 5 coupled axles. May 15: Locomotives with six coupled axles; freight locomotives. June 1: Tender locomotives and tenders.

Cab Signals. Locomotive Cab Signals. Int. Ry. Congress Assn.—Bul., vol. 5, no. 6, June 1923, pp. 590–616. Account of discussion dealing with repeating and recording track signals on locomotive, different systems already used or tried, results obtained, and recording running speed of locomotives.

Diesel-Engined. A New Diesel Locomotive, Georg Held and M. Kuljinski. Verkehrstechnik, vol. 40, no. 40, Oct. 5, 1923, pp. 361–363. Disadvantages of present-day steam locomotives and advantages of Diesel locomotives are pointed out; design of new Diesel locomotive and its useful possibilities.

How the Sulzer-Diesel Locomotive Operated. Oil Engine Power, vol. 1, nos. 7 and 8, July and Aug., 1923, pp. 337–339 and 401–406, 7 figs. Detailed description of Diesel engine which developed over 1600 b.hp. in a locomotive that weighed 95 tons and which represented greatest departure ever made from standard Diesel practice.

Electric. See ELECTRIC LOCOMOTIVES.

Half-Stroke Cut-off. Possibilities of Half Stroke Cut-off Locomotive, W. F. Kiesel, Jr. Ry. Age, vol. 75, no. 20, Nov. 17, 1923, pp. 903–906, 3 figs. Advantages of compound and three-cylinder types combined with simplicity of two-cylinder type. (Abstract.) Paper read before New York R. R. Club.

Headlights. Report of Committee (Assn. Ry. Elec. Engrs.) on Locomotive Headlights. Ry. Elec. Engr., vol. 14, no. 11, Nov. 1923, pp. 354–359, 4 figs. Status of marker and classification lights with regard to operating rules; photometry tests for headlight reflectors recommended.

Heat Economy in. Heat Economy in Steam Locomotives (Wärmewritschaft bei Dampflokomotiven), L. Schneider. Archiv fur Wärmewirtschaft, vol. 4, no. 8, Aug. 1923, pp. 145–149, 9 figs. Notes on firing, boiler, preheater, superheater, engine and valve gear, etc.

Internal-Combustion. Crude Oil Motor Locomotive. Engineering, vol. 116, no. 3018, Nov. 2, 1923, pp. 553–554, 12 figs. partly on p. 555. Details of locomotive built by Swedish firm; engine is 2-cylinder 2-cycle machine with crankcase compression, provided with hot-bulb ignition, and centrifugal governor controlling fuel pump.

Internal-Combustion Locomotives. Ry. Gaz., vol. 39, no. 18, Nov. 2, 1923, pp. 558–560, 3 figs. Discussion of the various phases of the subject; discusses the four classes.

Lubricated Area. A New Language for the Steam Locomotive. Ry. & Locomotive Eng., vol. 36, no. 11, Nov. 1923, pp. 346–348, 3 figs. Sets forth wide range of difference in lubricated areas between engines in same class of service.

Mikado. Mikado Locomotives for the Lehigh Valley. Ry. Mech. Engr., vol. 97, no. 11, Nov. 1923, pp. 739–742, 12 figs. Heavy freight engines for anthracite road burn soft coal; booster increases tonnage capacity.

Pacific Type. Pacific Type Locomotives, Canadian Pacific Railway. Can. Ry. & Mar. World, no. 309, Nov. 1923, pp. 513–516, 9 figs. Latest type has boilers of more than 100-per cent capacity in relation to cylinder requirements; built by Montreal Locomotive Works.

Passenger. Four-Cylinder 4–6–0 Type Locomotive of the Great Western Railway—England. Ry. & Locomotive Eng., vol. 36, no. 11, Nov. 1923, pp. 341–342, 3 figs. Tractive effort of 31,626 lb. is greater than any other British passenger locomotive.

Pennsylvania Ten-Wheel Passenger Locomotive. Ry. Age, vol. 75, no. 19, Nov. 10, 1923, pp. 859–860, 4 figs. New design for local passenger service with 68-in. drivers, develops 41,328-lb. tractive force. See also Ry. & Locomotive Eng., vol. 36, no. 11, Nov. 1923, pp. 337–340, 7 figs.

Suggested Design for a 4,000 h.p. Passenger Locomotive, H. A. F. Campbell. Ry. Age, vol. 75, no. 16, Oct. 20, 1923, pp. 707–708, 1 fig. Writer proposes 3-cylinder compound, superheater 2–8–4 type, tender locomotive.

Standardization. Standardization in Locomotive Construction (Normalisierung im Lokomotivbau und Typisierung der Kleinbahnlokomotiven), H. Najork. Verkehrstechnik, vol. 40, no. 36, Sept. 7, 1923, pp. 316–324, 12 figs. Discusses standards and work of Locomotive Standard Committee in standardization of construction parts, reduction of narrow-gage locomotive types through standardization, and interchangeability of parts.

Steam-Turbine. Ramsay Turbo-Electric Condensing Engine. Ry. Mech. Engr., vol. 97, no. 11, Nov. 1923, pp. 746–749, 6 figs. Experimental locomotive developed by Armstrong, Whitworth & Co.; details of latest modified design; results of tests.

Tank. New 0–8–4 Type Superheated Tank Locomotives, London Midland & Scottish Railway. Ry. Gaz., vol. 39, no. 18, Nov. 2, 1923, p. 551, 2 figs. Notes on locomotive designed and built at Crewe Works for operating mineral and local passenger trains on heavy gradients in South Wales; tests made.

New 2–6–4 Tank Engines for Local Service, Buenos Ayres Great Southern Railway. Ry. Gaz., vol. 39, no. 18, Nov. 2, 1923, p. 552, 2 figs. Notes on new type of engine recently put into service; three-cylinder simple, fitted with superheaters; working pressure 200 lb. per sq. in.

Three-Cylinder. New York Central Three-Cylinder Locomotive. Ry. Mech. Engr., vol. 97, no. 11, Nov. 1923, pp. 743–744, 1 fig., also Ry. Age, vol. 75, no. 18, Nov. 3, 1923, pp. 821–822, 1 fig. 4–8–2 type for freight service, with booster, develops 75,700 lb. tractive force; adhesion factor 3.73.

Wheel Guidance in Track. The Guidance and Running of Locomotive Wheels on the Track (Führung und Lauf des Lokomotivrades im Geleise), J. Buchli. Schweizerische Bauzeitung, vol. 82, no. 10, Sept. 8, 1923, pp. 119–125, 14 figs. Results of model tests for investigation of lateral holding power of a wheel on rail under widely differing operating conditions.

LUBRICANTS

Cutting Tools. Tool Engineering, Albert A. Dowd and Frank W. Curtis. Am. Mach., vol. 59, no. 17, Oct. 25, 1923, pp. 613–615, 1 fig. Cutting lubricants and their application; principles of coolants; suitability to material being cut; factors such as power consumption and removal of chips.

LUBRICATING OILS

Reclamation of. Reclaiming Power Plant Lubricants, Allen F. Brewer. Elec. Light & Power, vol. 1, no. 10, Oct. 1923, pp. 13–16 and 64–65, 8 figs. Describes methods of purification and reclamation systems.

Storage and Handling. Lubricating Oil Storage

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CLASSIFIED LIST OF MECHANICAL EQUIPMENT

Alphabetical List on page 168

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(See Coils, Covering, Fittings, etc., Pipe)

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and Handling Methods, Allen F. Brewer. Elec. Light & Power, vol. 1, no. 9, Sept. 1923, pp. 13–16, 76–77 and 79, 7 figs. Deals with type of shipping container that is to be handled, construction of oil house, equipment installed for handling shipping containers, storage tanks and their appurtenances, manner of delivery to the various parts of plant, and means for measuring oil so delivered.

LUBRICATION

Power Plants. What the Lubrication Engineer Has Done for Power Plant Maintenance, Allen F. Brewer. Indus. Management (N. Y.), vol. 66, no. 5, Nov. 1923, pp. 281–289, 10 figs. Discusses various lubricants and their characteristics, and shows how modern science of lubrication makes it possible to keep it under control.

M

MACHINE SHOPS

Equipment, Arrangement of. An example of Systematized Production, Fred R. Daniels. Machy. (N. Y.), vol. 30, no. 3, Nov. 1923, pp. 189–193, 8 figs. Arrangement of equipment used in producing predetermined quantity of work in given time; installed by Taft-Peirce Mfg. Co., Woonsocket, R. I. in department where gasoline savers for Ford carburetors are made.

MACHINE TOOLS

Refrigerating Machinery Manufacture. Manufacturing Refrigerating Machinery in a San Francisco Plant. West. Machy. World, vol. 14, no. 10, Oct. 1923, pp. 317–319, 8 figs. Some of the machine-tool equipment used at Cyclops Iron Works, manufacturers of ice and refrigerating equipment.

MAGNESIUM

Foundry Uses. Magnesium in the Foundry, H. J. Mayhrey. Metal Industry (Lond.), vol. 23, nos. 14 and 15, Oct. 5 and 12, 1923, pp. 292, and 315–318, 4 figs. Uses of magnesium; objection to chloride flux; procedure of magnesium melting and pouring; casting in chill molds; casting in sand molds; affinity for water; molding sand; casting design.

MARINE ENGINES

Double-Compound Reciprocating. The Double-Compound Reciprocating Engine of the Steamer Bilbao (Die Doppelverbund-Kolbenmaschine des Dampfers "Bilbao"), J. Eggers. Zeit. des Vereines deutscher Ingenieure, vol. 67, no. 43, Oct. 27, 1923, pp. 1008–1010, 5 figs. Describes new type of double-compound engine and practical results obtained.

MARINE STEAM TURBINES

German Construction. Marine Turbines of the German General Electric Co., Berlin (Der Schiffsturbinenbau der AEG-Berlin), E. A. Kraft. Zeit. des Vereines deutscher Ingenieure, vol. 67, no. 43, Oct. 27, 1923, pp. 1002–1007, 25 figs. Describes turbines, transmission gear, thrust bearings and condensers constructed by A. E. G.

MEASURING INSTRUMENTS

Out-of-Roundness Measurement. Factors Governing "Out-of-Roundness" Measurement. A. H. Frauenthal. Soc. Automotive Engrs.—Jl., vol. 13, no. 5, Nov. 1923, pp. 370–374, 7 figs. Types of out-of-roundness and those peculiar to certain machines; three-point measuring system; errors of V-block method; use of V-block for elliptical objects; other methods of checking elliptical forms and indicator-reading correction; three items for instrument improvement are suggested.

METALS

Cleaning. Metal Cleaning. F. H. Guernsey. Machy. (N. Y.), vol. 30, no. 3, Nov. 1923, pp. 185–186. Deals with factors involved in effective cleaning, namely, condition of water, type of equipment, temperature of cleaner, and time allowed for cleaning.

Cold Working. The Cold Working of Metals. Machy. (Lond.), vol. 23, no. 575, Oct. 4, 1923, pp. 17–20, 5 figs. Relative effects of cold and hot working; bright drawn steel bar; cold-drawn tubing; wire drawing; cold-working effects on non-ferrous metals.

Internal Strains. The Heyn Theory of the Stiffening of Metals Due to Hidden Elastic Stresses (Zur Heyn'schen Theorie der Verfestigung der Metalle durch verborgen elastische Spannungen), Georg Masing. Wissenschaftliche Veröffentlichungen aus dem Siemens-Konzern, vol. 3, no. 1, May 15, 1923, pp. 231–239, 4 figs. Confirmation of Heyn's theory that stiffening phenomena are partially due to internal strains.

Overstrain. Overstrain in Metals, Joseph Kaye Wood. Am. Inst. Min. & Met. Engrs.—Trans., no. 1278-S, Nov. 1923, 13 pp., 12 figs.; also (abstract) in Min. & Metallurgy, vol. 4, no. 203, Nov. 1923, pp. 575–577, 1 fig. Overstrain depends on partial elastic action occurring above elastic limit; amount depends on amount of "hyper" elastic energy expended, which energy corresponds to partial elastic action; this energy depends furthermore on elastic and plastic constants of metal; with aid of these principles shape of stress-strain diagram is explained.

Testing, Value of Energy Relation in. The Value of the Energy Relation in the Testing of Ferrous Metals at Varying Ranges of Stress and at Intermediate and High Temperatures, T. M. Jasper. Lond., Edinburgh, & Dublin Philosophical Mag. & Jl. Sci., vol. 46, no. 274, Oct. 1923, pp. 609–627, 10 figs. Development of energy equation with reference to testing; testing materials at various temperatures; application of use of energy relation to static testing of ferrous materials at various temperatures. Conclusions based on fatigue experiments.

MICROMETERS

Ocular. A New Ocular Micrometer, Hermann Kellner. Optical Soc. Am.—Jl., vol. 7, no. 10, Oct. 1923, pp. 889–891, 4 figs. Describes micrometer employing sliding measuring wedge in place of micrometer screw.

MILLING CUTTERS

Spacing. Combination Distance Pieces. Machy. (Lond.), vol. 23, no. 578, Oct. 25, pp. 113–115, 4 figs. Novel system of spacing collars for accurately positioning milling cutters.

MOTOR BUSES

Double-Deck. New Sixty-nine-Passenger Double-Decker Installed in Chicago. Bus Transportation, vol. 2, no. 9, Sept. 1923, pp. 427–430, 11 figs. Describes bus developed by Yellow Coach Mfg. Co., with 4-wheel brakes, rigid frame and sleeve-valve engine.

Improvements. Low Frames, Air-Brakes and 6-Cylinder Engines Feature New Buses, Herbert Chase. Automotive Industries, vol. 49, no. 16, Oct. 18, 1923, pp. 779–784, 8 figs. Federal, International, Yellow, Pierce-Arrow and Acme show new models at exhibit in Atlantic City: changes in Mack, White and F. A. C.

Six-Wheel. A Six-Wheel Stage Is Developed in California. Bus Transportation, vol. 2, no. 6, June 1923, pp. 265–267, 6 figs. Describes vehicle with a 4-wheel rear end in service on Cal. Transit Co.'s system, having seating capacity of 26; 26 ft. long from front to rear bumpers; better braking, no skidding, wider tread, more tire mileage and easier riding are advantages claimed for it.

Street Cars vs. Comparative Utility of Motor 'Bus and Tramcar. Elec. Ry. & Tramway Jl., vol. 49, no. 1202, Sept. 14, 1923, pp. 120–121, 172 and 174–175, 4 figs. Report by H. Mattinson to Manchester Tramways Committee, discussing advantages and disadvantages of the two vehicles, trackless-trolley buses, spheres of operation of motor bus, capital and operation costs, etc.

25-Passenger Body. A Bus a Day Turned Out by Operator. Bus Transportation, vol. 2, no. 11, Nov. 1923, pp. 515–518, 4 figs. Details of construction of new 25-passenger bodies designed and built in shops of Pacific Elec. Ry. at Torrance, Cal.; how six buses a week were put through car shops.

Youngstown, Ohio, Service. De Luxe Service Given by Interurban Coach Line. Bus Transportation, vol. 2, no. 4, Apr. 1923, pp. 175–178, 7 figs. Pennsylvania-Ohio Elec. Co. operates coach lines paralleling interurban routes; revenues of both lines increased, competition lessened and traffic divided into two classes since adoption of coaches; lines serve steel manufacturing and farming district bordering on Ohio-Pennsylvania line.

MOTOR PLOWS

Comparative Tests, M.A.N. and Stock. A Comparative Test of the M.A.N. and Stock Motor Plows (Eine Vergleichsprüfung der Motorpflüge MAN und Stock), H. Martiny. Motorwagen, vol. 26, no. 25, Sept. 10, 1923, pp. 371–374. Results of experiments and conclusions for the constructor and for testing of motor plows.

MOTOR TRUCKS

A.E.C. An A.E.C. 2-Tonner. Motor Transport, vol. 37, no. 970, Oct. 1, 1923, pp. 414–417, 7 figs. Entirely new model for goods or passenger service embodying many special feature; 4-cylinder engine developing 30 b.hp. at 1000 r.p.m.; 4-speed gear box.

French. Continental Transport Vehicle Design. Motor Transport (Lond.), vol. 37, no. 975, Nov. 5, 1923, pp. 568–569. Data in tabular form giving leading dimensions of business vehicle and municipal chassis on French market.

German. German Lorry Design. Motor Transport, vol. 37, no. 970, Oct. 1, 1923, pp. 418–419, 1 fig. Tendencies of chassis building practice as shown by a percentage comparison between 1922 and 1923 models.

Karrier. The 20–25 Cwt. Karrier. Motor Transport (Lond.), vol. 37, no. 975, Nov. 5, 1923, pp. 556–558, 7 figs. Details of Z type Karrier chassis; 4-cylinder 18.2-hp. engine; standard pneumatic tire equipment.

Krupp Special Types. Motor Vehicles Constructed by Krupp. Kruppsche Monatshefte, vol. 4, Sept. 1923. Contains following articles: Motor Fire Engines, (Motor-Feuerspritze Bauart Krupp), Heinrich Eckertz, pp. 151–153, 2 fig.; Special Motor Trucks for Transport of Bulk Goods, Bar Iron, Lumber, Etc. (Sonderkraftfahrzeuge für Sperr- und Massengut), H. Hagelloch, pp. 153–159, 10 figs. Modern Street-Cleaning Vehicles (Ueber neuzeitliche Strassenreinigung), Fr. Sachtleben, pp. 159–163, 6 figs.

Radiators. Motor-Truck Radiator-Design, R. S. Wentworth. Soc. Automotive Engrs.—Jl., vol. 13, no. 5, Nov. 1923, pp. 393–394. Enumerates seven requirements dictated by necessity for greater reliability of truck radiators.

MOTORCYCLES

Berlin Show. Motorcycles at the Automobile Show 1923 (Berlin) (Die Motorräder auf der Automobil-Ausstellung 1923), G. Stünlein. Motorwagen, vol. 26, no. 27, Sept. 30, 1923, pp. 409–410. Details of exhibits.

British Show. The Cycle and Motor-Cycle Show at Olympia. Engineering, vol. 116, nos. 3016 and 3017, Oct. 19 and 26, 1923, pp. 503–506 and 519–522, 20 figs. Details of design of exhibits.

O

OIL ENGINES

Airless-Injection. Solid Injection Fuel Systems of Oil Engines, Richard D. Watson. Oil Engine Power, vol. 1, no. 10, Oct. 1923, pp. 495–497. Notes on design of spray valves and fuel pumps for airless injection engines, with consideration of factors influencing problems that have to be met.

Development. The Crude Oil Engine, Johnstone-Taylor. Gas & Oil Power, vol. 19, nos. 215, 216 and 217, Aug. 6, Sept. 6 and Oct. 4, 1923, pp. 184–186, 203–205 and 11–14, 13 figs. Development of present designs. Convertible gas and oil engines; describes four-stroke and two-stroke engines.

Marine, Clyde. Clyde Marine Oil-Engines, A. L. Mellanby. Instn. Mech. Engrs.—Proc., no. 4, June 1923, pp. 695–731, 15 figs. Deals with tonnage regulations; lubrication problems; starting and manoeuvring; power rating. Particular types of Clyde engines: examples of four- and two-stroke cycle engines; double-acting engines.

Marine, Design. Small Marine Engine Design from the User's Point of View, Basil H. Joy. Automobile Engr., vol. 13, no. 182, Nov. 1923, pp. 343–347, 6 figs. Deals specifically with 4-cycle poppet-valve gasoline engine without any reversing gear, with view to ease of manufacture (price), ease of overhaul, and ease of access for more or less minor adjustments, repairs, or renewals.

OIL FUEL

Characteristics. Fuel Oil Characteristics And Advantages As Compared with Coal, A. P. Bjerregaard. Nat. Petroleum News, vol. 15, no. 42, Oct. 17, 1923, pp. 32A–32B. Some comparisons of B.t.u. values of various gravities of Mid-Continent fuel oils, and comparative price table of fuel oil and coal based on a B.t.u. value for fuel oil of 19,000-per-lb. and 10,000-per-lb. coal; methods for testing water content of fuel oil. Paper read before Purchasing Agents' Assn..

Gasification. External and Internal Gasification (Ueber äussere und innere Vergasung), S. della Porta. Motorwagen, vol. 26, no. 25, Sept. 10, 1923, pp. 377–378. Discusses process of gasification, and investigates gasification from viewpoint of distribution of gasified fuel in the air.

OPEN-HEARTH FURNACES

Regenerators. Open-Hearth Furnace Regenerators, Fred B. Quigley. Iron Age, vol. 112, no. 19, Nov. 8, 1923, pp. 1245–1246, 1 fig. Proportionate sizes of chambers for air and gas; insulation; doing away with gas regenerators suggested. (Abstract.) Paper read before Am. Iron & Steel Inst. See also Iron Trade Rev., vol. 73, no. 17, Oct. 25, 1923, pp. 1172–1173 and 1181–1182, 1 fig.

OXY-ACETYLENE WELDING

Applications. Practical Applications of Gas welding, E. A. Whittaker. Engineering, vol. 116, no. 3018, Nov. 2, 1923, pp. 571–572. Deals with repairs and construction of iron and steel, cast iron, aluminum, copper, brasses and bronzes. (Abstract.) Paper read before Instn. Welding Engrs.

Equipment Maintenance. Maintaining Oxy-Acetylene Equipment in Service. Acetylene Jl., vol. 25, nos. 4 and 5, Oct. and Nov. 1923, pp. 201–204 and 206; and 234, 236 and 238, 5 figs. Proper maintenance of oxy-acetylene welding and cutting equipment.

Locomotive Repairs. Welding in Locomotive Repair Shops, Fred E. Rogers. Acetylene Jl., vol. 25, no. 5, Nov. 1923, pp. 221–228 and 232, 19 figs. Particulars regarding the various oxy-acetylene welding operations that have been profitably employed in locomotive repair work. Paper read before Chattanooga Regional meeting of Southern Local Sections of A.S.M.E.

P

PACKING

Containers. Solving the Shipping Container Problem, B. L. Huestis. Management & Administration, vol. 6, no. 5, Nov. 1923, pp. 575–580, 9 figs. Discusses faults in crate construction; wooden boxes; fiber boxes; testing of containers; method of testing by vibration; savings made by large manufacturers.

PATTERNS

Automotive, Drafting. Automotive Pattern Drafting, Warren Scholl. Sheet Metal Worker, vol. 13, nos. 25, 26 and vol. 14, nos. 1, 2, 4, 6, 8, 11 and 13, Jan. 5, 19, Feb. 2, 16, Mar. 2, Apr. 13, May 11, June 22 and July 20, 1923, pp. 840–844, 894–897, 6–7 and 36, 46–47, 83–84, 204–206, 283–295, 405–407, 490–491 and 515, 43 figs. Describes methods of laying out patterns for—Jan. 5: Fender with straight seam edge parallel in plan to straight chassis flange. Jan. 19: Hoods. Feb. 2: Radiator splash shields. Feb. 16: Cylindrical tanks. Mar. 2 and Apr. 13: Rear fenders for touring cars. May 11: Running-board shields. July 20: Full crown front fenders.

PEAT

Boiler Fuel. Engineering Principles Involved in the Firing of Peat in Boiler Operation (Die Feuerungstechnik des Torfes im Dampfkesselbetrieb), W. Leder. Wärme, vol. 46, nos. 33, 34, 36, 37 and 38, Aug. 17, 24, Sept. 7, 14 and 21, 1923, pp. 363–367, 377–380, 400–404, 411–414 and 419–421, 3 figs. Properties of peat as technical fuel; thermal value, evaporative

Manufactured by Advertisers — CLASSIFIED LIST OF MECHANICAL EQUIPMENT — Alphabetical List on page 168

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* Taylor Instrument Cos.

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* Jones, W. A. Fdry. & Mach. Co.

Racks, Storage, Metal
Manufacturing Equipment & Engrg. Co.

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* Frost Mfg. Co.
* Ingersoll-Rand Co.
* Scaife, Wm. B. & Sons Co.
* Walsh & Weidner Boiler Co.
* Wheeler Cond. & Engrg. Co.
* Worthington Pump & Machinery Corp'n

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Recorders, CO
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* Tagliabue, C. J. Mfg. Co.
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Elliott Co.
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Squires, C. E. Co.

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(See Counters, Revolution)

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* General Electric Co.

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Mackintosh-Hemphill Co.

Riveters, Pneumatic
* Ingersoll-Rand Co.

Riveting Machines
* Long & Allstatter Co.

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Treadwell Engineering Co.

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Mackintosh-Hemphill Co

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Johns-Manville (Inc.)

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Link-Belt Co.

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(See Dies, Thread Cutting)

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* Jones & Lamson Mch. Co.
* Warner & Swasey Co.

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* Scovill Mfg. Co.

Screws, Safety Set
Allen Mfg. Co.
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Screws, Set
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Elliott Co.
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Hoppes Mfg. Co.
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* Gwilliam Co.

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(See Stacks, Steel)

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Steel Plate Construction
* Bigelow Co.

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capacity and efficiency; behavior on grate; velocity of combustion; peat in mixture with other fuels; evaporating results with peat in different types of furnaces; tests with mixtures of peat and other fuels.

PHOTOELASTICITY

Application to Engineering Problems. Engineering Problems Solved by Photo-Elastic Methods, E. G. Coker. Franklin Inst.—Jl., vol. 196, no. 4, Oct. 1923, pp. 433–478, 34 figs. Lecture I: Improvements in apparatus; contact pressures and stresses. Lecture II: The testing of materials in tension; action of cutting tools. Bibliography.

PIPE

Wrapping Machines. Automatic Pipe-Wrapping Machine, Edward Houchins. Indian & Eastern Engr., vol. 52, no. 1, July 1923, pp. 18–19, 4 figs. Portable, automatic machine made by San Francisco firm, through which pipe of diameters up to 10 in. can be fed, and thoroughly wrapped so as to be impervious to moisture, at rate of 750 lin. ft. per hr.

PISTON RINGS

Finishing Grooves. Finishing Piston-Ring Grooves. Soc. Automotive Engrs.—Jl., vol. 13, no. 5, Nov. 1923, pp. 407–408. Information on various practical methods.

PLANING

Rotary, High-Speed. High-speed Rotary Planing, Stafford Ransome. Engineer, vol. 136, nos. 3537, 3538 and 3539, Oct. 12, 19 and 26, 1923, pp. 388–390, 413–415, and 441–445, 15 figs. Oct. 12: Theory and practice; ridging and tracking; square and circular blocks; feed and its effect. Oct. 19: Cutters and cutter blocks. Oct. 26: High-speed rotary planing machine; variable feed gears; feeding-in tables; high-speed flooring machines; problem of pressures; driving.

POLISHING

Abrasives, Application to Wheels. Practical Hints for Polishers, Francis D. Bowman. Foundry, vol. 51, no. 21, Nov. 1, 1923, pp. 860–861, 3 figs. Helpful suggestions touching on properties and preparation of glue, correct temperature in setting up and storing wheels together with method of applying abrasive to wheels.

POWER PLANTS

Cost Keeping. Uniform Costs for Power Plants, Alfred Baruch. Power Plant Eng., vol. 27, nos. 12, 13, 14 and 15, June 15, July 1, 15 and Aug. 1, 1923, pp. 623–625, 671–673, 720–722 and 774–775, 3 figs. June 15: Labor records; pay-roll distribution; budget labor costs. July 1: Factors entering into intelligent analysis of operating expenses. July 15: Distribution of fixed expenses; interest and depreciation in plant costs. Aug. 1: Predetermination of rates and monthly comparison of plant costs.

Piping Standards. Standards in Power Plant Piping Practice. Power Plant Eng., vol. 27, no. 14, July 15, 1923, pp. 717–719, 3 figs. Commercial practice varies so that piping standards may become confusing. Points out many of the practices which must be watched for.

Solid-Injection Oil Engines for. Solid Injection Engine in Isolated Power Plants, H. F. Briggs. Eng. World, vol. 23, no. 4, Oct. 1923, pp. 228–231. Comparative cost analysis of twelve different prime movers; states that solid-injection oil engines require skilled attention, and when this is supplied will prove themselves thoroughly reliable and dependable; simplicity of design and cheapness of power output make them ideal prime mover for isolated power plant.

Testing. Power Plant Testing, W. M. Selvey. South Wales Inst. Engrs.—Proc., vol. 38, no. 8, Sept. 26, 1923, pp. 631–663 and (discussion) 663–667, 29 figs. Discusses principles involved and measuring apparatus available.

PRESSES

Drawing Tools for. Design and Operation of Drawing Tools for Presses (Wirkungsweise und Bauart der Ziehwerkzeuge), W. Sellin. Zeit. des Vereines deutscher Ingenieure, vol. 67, no. 41, Oct. 13, 1923, pp. 972–975, 17 figs. Drawing tools for drawing and for eccentric presses.

PRODUCER GAS

Peat as Source of. Producer Gas From Peat, G. W. Semmes. Manufacturers Rec., vol. 84, no. 16, Oct. 18, 1923, pp. 75–77. Survey of possibilities of peat as a gas producer; gas producers.

PULVERIZED COAL

Boiler Firing. Powdered Coal Meets Load Variations in Blast-Furnace Gas Plant. Power, vol. 58, no. 19, Nov. 6, 1923, pp. 718–721, 5 figs. In boiler installation in Ensley Works of Tennessee Coal, Iron & Railroad Co. pulverized coal supplements blast-furnace gas to maintain uniform supply of steam; outstanding features of plant are automatic control of gas and air mixture and feed of pulverized coal.

PUMPING STATIONS

Construction. Typical Power-Plants and Pumping-Stations for Water-Works, Charles B. Burdick. Am. City Mag., vol. 29, no. 5, Nov. 1923, pp. 467–471, 2 figs. Examples of recent pumping-station construction, with illustrations and figures of cost.

Equipment Selection. Equipment for Pumping Stations, A. L. Mullergren. Can. Engr., vol. 45, no. 14, Oct. 2, 1923, pp. 365–367. Considerations in selecting equipment; reliability, adequacy and economy principal factors; efficiency of central stations.

PUMPS

Axiflo. Pumping Plants to Lower Water Level. Ariz. Min. Jl., vol. 7, no. 10, Oct. 15, 1923, pp. 6–8, 7 figs. Study of handling of rising water level in Salt River valley by engineers of Worthington Pump and Machinery Co. which led to development of new Axiflo pump.

PUMPS, CENTRIFUGAL

High-Lift. High Lift Turbine Pumps. Beama, vol. 13, no. 67, Nov. 1923, pp. 317–320, 6 figs. Describes turbine pumps for high-lift conditions manufactured by Mirrlees Watson Co. in two distinct forms, the ring and the barrel casing types.

R

RAILS

Transverse Fissures. Formation of Transverse Fissures in Steel Rails, James E. Howard. Eng. News-Rec., vol. 91, no. 18, Nov. 1, 1923, pp. 720–722. Abstract of latest report to Interstate Commerce Commission, together with discussion.

RAILWAY ELECTRIFICATION

England. Railway Electric Traction, Roger T. Smith. Ry. Gaz., vol. 39, no. 17, Oct. 26, 1923, pp. 511–512. Discusses question of railway electrification in England as an economic proposition. Address before Société des Ingénieurs Civils de France.

Norway. Electrification of Railway from Narvik to Riksgränsen in Norway (Den elektriserte Ofotbane), Hj. Schreiner. Teknisk Ukeblad, no. 33, Aug. 31, 1923, pp. 271–275, 8 figs. Description of Norwegian part of railway between Lulea, Sweden and Narvik, Norway; transmission line will carry single-phase current at 80,000 volts and 15 cycles, which will be reduced to 16,200 volts in two transformer stations, each having two 1500-kva transformers.

RAILWAY MOTOR CARS

Electric. Motor Cars for the Mersey Electric Railway. Ry. Gaz., vol. 39, no. 18, Nov. 2, 1923, pp. 556–557, 1 fig. Particulars of new motor cars for operating three- and five-car trains; overall length 60 ft. 3½ in., width overall 8 ft. 7 in., height from rail to top of roof 12 ft. 10 in.; electro-pneumatic control.

Gasoline. Multiple Unit Control for Self-Propelled Cars. Ry. Rev., vol. 73, no. 17, Oct. 27, 1923, pp. 610–617, 11 figs. Describes new Mack car, electro-pneumatically controlled, equipped with six-cylinder 120-hp. gasoline motor.

Two-Car Train. Two-Car Motor Train for the Mississippi Central. Ry. Age, vol. 75, no. 20, Nov. 17, 1923, pp. 899–900, 4 figs. Chassis, of 4-wheel drive type, and trailer provide baggage space and seats for 46 passengers.

Types. Report of Committee (Assn. Ry. Elec. Engrs.) on Self-Propelled Rail Cars. Ry. Elec. Engr., vol. 14, no. 11, Nov. 1923, pp. 333–338, 8 figs. Advantages and drawbacks of different types of railway motor cars and class of service for which they are fitted.

RAILWAY OPERATION

Car Pooling. Car Pooling on the Pennsylvania, Geo. L. Fowler. Ry. & Locomotive Eng., vol. 36, no. 11, Nov. 1923, pp. 361–362. Its origin and effect on cost of repairs and facilitating transportation.

Slow Freight Traffic. Slow-Freight Traffic. Int. Ry. Congress Assn.—Bul., vol. 5, no. 6, June 1923, pp. 558–589. Account of discussion dealing with: organization of slow-freight traffic in order to increase effective operation of rolling stock and lines; advisability of using, according to circumstances, heavy or light, fast or slow trains; through trains; pick-up trains and distributing trains; shuttle services.

Train Control. Automatic Train Control on the Missouri Pacific R. R., Bertram H. Mann. Ry. Rev., vol. 73, no. 19, Nov. 10, 1923, pp. 681–683, 1 fig. Describes underlying principles of automatic train control so far as operation of trains, and its influence on track capacity, is concerned.

G.R.S. Train Control Demonstrated on C. & N. W. Ry. Age, vol. 75, no. 16, Oct. 20, 1923, pp. 717–718. 4 figs. Actual service test shows practicability of intermittent tapered speed control and stop indications.

Train Control. Ry. Signaling, vol. 16, no. 11, Nov. 1923. Contains following articles: Train Control Experience of C. & E. I., pp. 438–440, 4 figs.; C. & A. Tests National Train Control, pp. 441–442, 2 figs.; C. & N. W. Tests G. R. S. Train Control, pp. 443–445, 8 figs.

Train Despatching. Telephone Selector Systems in Use on Railroads, Chas. Stanley Rhoads. Ry. Signaling, vol. 16, no. 11, Nov. 1923, pp. 458–461, 3 figs. Methods of train despatching by telephone; selectors—description, uses and requirements.

RAILWAY REPAIR SHOPS

Locomotive. Locomotive Shop Served by 180-Ton Crane: M.-K.-T. R. R. Eng. News-Rec., vol. 91, no. 19, Nov. 8, 1923, pp. 762–764, 4 figs. Transverse track layout; enlargement and future transfer table.

Progressive System for Locomotive Shops, Lawrence Richardson. Ry. Age, vol. 75, no. 17, Oct. 27, 1923, pp. 767–770, 2 figs. Straight-line method used in modern industrial plants applied to classified repairs.

RAILWAY SHOPS

Electric Welding. Report of Committee (Assn. Ry. Elec. Engrs.) on Electric Welding. Ry. Elec. Engr., vol. 14, no. 11, Nov. 1923, pp. 367–369, 4 figs. Economic status of arc welding, and relative costs of electric arc welding and other processes, particularly oxy-acetylene.

RAILWAY SIGNALING

Automatic Block. Direct Current Automatic Block Signaling. Am. Ry. Assn. Signal Section—advance notice for meeting Nov. 14–15, 1923, pp. 111–144. Instructions for making train shunt resistance tests; and for testing resistance of switch circuit controller, shunting circuits and contacts; report on maximum resistance for switch circuit controllers, shunting circuits and contacts. Report of Committee IV.

Economics. Economics of Railway Signaling. Am. Ry. Assn. Signal Section—advance notice for meeting Nov. 14–15, 1923, pp. 145–157, 2 tables. Economic value of operating remote switches; savings effected by use of power switch machines for operation of remote switches as reported by railways. Report of Committee I.

Highway Crossings. Highway Crossing Signals on the N.Y.C.R.R. Ry. Rev., vol. 73, no. 18, Nov. 3, 1923, pp. 647–649, 4 figs. Gives circuits and methods of control and operation of highway crossing signals which have been installed by N. Y. Central at some of its busiest street intersections at grade.

Interlocking. Mechanical Interlocking. Am. Ry. Assn. Signal Section—advance notice for meeting Nov. 14–15, 1923, pp. 96–110. Specification for electro-mechanical interlocking machine, unit electric levers, and locking. Report of Committee II.

New Interlockers on the Flint Belt Line, H. C. Lorenzen. Ry. Signaling, vol. 16, no. 11, Nov. 1923, pp. 447–449, 7 figs. One electric plant handles two separate crossings that are 3450 ft. apart; trunking superseded by suspended cables; tower has three floors.

Power Interlocking. Am. Ry. Assn. Signal Section—advance notice for meeting Nov. 14–15, 1923, pp. 18–23, 4 figs. Specification for location and layout for way stations; typical plans for joint occupancy of signal stations by telegraph and telephone apparatus. Report of Committee III.

RAILWAY TIES

Hollow Elastic. The Nature and Advantages of Elastic Railway Ties (Das Wesen und die Vorteile der elastischen Schienenunterstützung), H. Scheive. Verkehrstechnik, vol. 40, no. 37, Sept. 14, 1923, pp. 341–342, 3 figs. Discusses elastic hollow ties recommended by author and comparative tests with these and inelastic steel trough-shaped ties heretofore in use.

Reinforced-Concrete. The Stent Reinforced Concrete Railway Sleeper. Engineering, vol. 116, no. 3017, Oct. 26, 1923, pp. 536–537, 8 figs. Describes reinforced-concrete sleeper of block-and-tie pattern now in use on several railways in India, and points out advantages of system.

Specifications. Ties. Am. Ry. Eng. Assn.—Bul., vol. 25, no. 257, July 1923, pp. 10–15, 6 figs. Fundamentals to be considered in designs of substitute ties; care of ties after distribution; installation and keeping records of cross-tie test sections.

Treatment and Care. Treatment and Care of Railroad Ties, S. D. Cooper. Eng. & Contracting (Railways), vol. 60, no. 4, Oct. 17, 1923, pp. 818–821, 2 figs. Describes practice of Atchison, Topeka & Santa Fe Ry. Paper read before Roadmasters & Maintenance of Way Assn.

RAILWAY TRACK

Maintenance. Maintenance of Way—Improved Methods and Results on the Lehigh Valley Railroad, G. L. Moore. Central Ry. Club—Official Proc., vol. 31, no. 4, Sept. 1923, pp. 1408–1417. Description of use of locomotive cranes for rail anchoring, track laying and rapid handling of material; important economies effected.

Specifications. Track. Am. Ry. Eng. Assn.—Bul., vol. 25, no. 257, July 1923, pp. 21–25. Addition to frog and switch plans; details of switch-stand target shapes; oiling track fixtures; specifications for laying of new track.

REFRIGERATING MACHINES

Air. Cooling With Air, M. Leblanc. Refrig. Eng., vol. 10, no. 3, Sept. 1923, pp. 101–106, 11 figs. Use of air as a refrigerating agent in place of chemicals; study of air refrigerating machines, including their cycle, fundamental observations, how cycle is effected in practical machines, conception of new machine, scavenging operations, and manner of realizing a machine with scavenging operation applied. From Revue Générale du Froid, Oct. 1922.

Automatic. Automatic Refrigerating Machinery, J. C. Goosmann. Ice & Refrigeration, vol. 63, no. 6, Dec. 1922, pp. 61–63, and vol. 64, nos. 2, 3 and 4, Feb., Mar. and Apr., 1923, pp. 131–135, 205–210 and 320–323, 20 figs. Three general groups of refrigerating plants; semi- and fully automatic refrigerating machinery; lubrication; water-flow control; condenser safety valves.

ROLLING MILLS

Sheet Mills. Making Sheets at Granite City (Ill.), E. C. Boehringer. Iron Trade Rev., vol. 73, no. 20, Nov. 15, 1923, pp. 1363–1366, 8 figs. Describes new sheet and jobbing mills of Nat. Enameling & Stamping Co.; coke-oven gas and coal used as fuel; mechanical equipment reduces labor costs.

S

SANDS, MOLDING

Minnesota. The Foundry Sands of Minnesota, G. N. Knapp. Univ. of Minn., Geol. Survey—Bul., no. 18, 1923, 105 pp., 15 figs. Report of investigation begun in 1918. Geology; geological formations yielding foundry sands, loams and clays; list of Minnesota foundries and localities supplying them with foundry sands; laboratory methods of testing foundry sands, loams and clays; mechanical and mineral analyses.

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*Catalogue data of firms marked * appear in the A.S.M.E. Condensed Catalogues of Mechanical Equipment, 1923-24 Volume*

Testing and Standardization. The Testing of Moulding Sands with Special Reference to Standardization, C. W. H. Holmes. Foundry Trade Jl., vol. 28, nos. 372 and 373, Oct. 4 and 11, 1923, pp. 296–298 and 308–311, 1 fig. Chemical and mineral constitution; meaning of "clay;" mechanical constitution; methods employed for mechanical grading sand; nature and estimation of bond; venting properites; strength or cohesiveness of sands; selection of standardization of tests. Paper presented to Paris Congress.

SCALES

Railway Service. Specifications for the Manufacture and Installation of Motor-Truck, Built-In, Self-Contained, and Portable Scales for Railroad Service. Am. Ry. Eng. Assn.—Bul., vol. 25, no. 257, July 1923, pp. 40–60.

SCRAP

Utilization. Saving Money from Scrap Materials. Indus. Management (Lond.), vol. 10, no. 9, Nov. 1, 1923, pp. 242–243. Examples of savings effected by utilization of scrap material in large electrical works.

SEAPLANES

Navy-Wright—2. The American Navy-Wright Schneider Cup Challenger. Flight, vol. 15, no. 39, Sept. 27, 1923, p. 575, 2 figs. Describes the N.W.-2, one of the American entries for Schneider Cup Seaplane Race; a biplane having 700-hp. Wright T-type engine; wing spread 28 ft., height 11 ft. 7 1/2 in., length 28 ft. 4 1/4 in.

Schneider Race, England. On the Schneider Troply Competition. Aeroplane, vol. 25, no. 14, Oct. 3, 1923, pp. 329–330, 332, 334, 336, 340, 342, 344, 346, 348, 350 and 352, 14 figs. Account of race. Includes article by W. H. Sayers entitled The Lesson of the Schneider Cup Race, discussing design of winning Curtiss racer, and design of other competing planes. Notes on the navigability trials. See also Flight, vol. 15, no. 40, Oct. 4, 1923, pp. 592–601, 16 figs.

The Story of the Schneider Cup Seaplane Race. Aviation, vol. 15, no. 19, Nov. 5, 1923, pp. 574–576, 4 figs. Description of American, British and French teams; America's victory; British performance.

SEMI-DIESEL ENGINES

Primm. Outstanding Features in Modern Oil Engines, Julius Rosbloom. Ariz. Min. Jl., vol. 7, no. 11, Nov. 1, 1923, pp. 18–19, 2 figs. Details of "Primm" oil engine, a two-cycle semi-Diesel engine, manufactured by Power Mfg. Co. at Marion, Ohio, and principle of its operation.

SEPARATORS

Oil. The "Rocket" Oil Separator. Engineering, vol. 116, no. 3016, Oct. 19, 1923, pp. 492–493, 1 fig. Device can be installed on ship for purpose of recovering oil and discharging only clear water overboard; can also be installed on shore for treating oil discharge from ships in port. See also Petroleum Times, vol. 10, no. 250, Oct. 20, 1923, pp. 557–559, 2 figs.

SHAFTS

Critical Speeds. The Critical Speeds of Turbine Shafts (Die kritischen Drehzahlen von Turbinenwellen), Wilh. Müller. Zeit. für technische Physik, vol. 4, no. 3, 1923, pp. 88–93, 3 figs. Describes theory of critical speeds of rotating shafts with constant and inconstant mass distribution, taking natural weight into consideration.

The Determination of the Critical Speeds of Elastic Shafts and Their Stability (Ueber die Bestimmung der kritischen Drehzahlen von elastischen Wellen und deren Stabilität), Theodor Pöschl. Zeit. für angewandte Mathematik u. Mechanik, vol. 3, no. 4, Aug. 1923, pp. 297–312, 5 figs. Dynamic investigation prompted by troubles observed in operation of steam turbines and similar machines with high-speed elastic shafts and in disks mounted on these machines.

Critical Torsional Moment. The Critical Twisting Moment of Shafts (Das kritische Drillungsmoment von Wellen), R. Grammel. Zeit. für angewandte Mathematik u. Mechanik, vol. 3, no. 4, Aug. 1923, pp. 262–271, 4 figs. Calculation of critical moment of torsion for any given cross-sections.

SMOKE

Physico-Chemical Investigation. The Physico-Chemical Investigation of Smoke as a Basis for Its Abatement and Utilization (Die physikalisch-chemische Erforschung des Rauches als Grundlage seiner Bekämpfung und Verwertung), V. Kohlschütter. Metall u. Erz, vol. 20, no. 19, Oct. 8, 1923, pp. 345–353. Results of application of physical chemistry to investigation of smoke.

SOLDERS

Aluminum. A New Aluminum Soldering and Welding Medium [("Hürco"), ein neues Aluminium-Löt- und Schweissmittel)], Max Wille. Fördertechnik u. Frachtverkehr, vol. 16, no. 18, Sept. 18, 1923, pp. 206–208, 5 figs. Describes new preparation known as Hürco solder, chief advantage of which is that it does not flow when melted but changes gradually into a pasty condition so that it can be molded as a plastic mass the same as sculpture clay.

SOOT BLOWERS

Mechanical. Economies of Mechanical Soot Blowers, Robert June. Power Plant Eng., vol. 27, no. 21, Nov. 1, 1923, pp. 1070–1073, 5 figs. Savings due to use of soot blowers; comparative costs of soot blowing.

STEAM

Specific Heat. Conclusions from Latest Investigations at Munich, Germany, of the Specific Heat of Steam (Folgerungen aus den neuesten Münchener Untersuchungen der spezifichen Wärme des Wasserdampfes), H. Schmolke. Wärme, vol. 46, no. 37, Sept. 14, 1923, pp. 409–410. Supplement to author's article in same journal, no. 23, 1923.

STEAM-ELECTRIC PLANTS

England. The Bolton Electricity Undertaking. Elec. Rev., vol. 93, no. 2394, Oct. 12, 1923, pp. 540–543, 7 figs. Generating station will have ultimate capacity of 46,000 kw.; turbine room contains six turbines of different sizes and makes, each coupled to generator and exciter.

Manchester, England. England's Latest Generating Station, W. H. Onken. Elec. World, vol. 82, no. 20, Nov. 17, 1923, pp. 1010–1012, 6 figs. Features of Barton station of Manchester Corp.; it is of superpower type sanctioned by Great Britain's Electricity Commission and is typical of modern English steam-station practice.

Two Pressures, Operation with. Lorain Plant Operates With Two Pressures. Power Plant Eng., vol. 27, no. 22, Nov. 15, 1923, pp. 1117–1123, 9 figs. Pressure of new 20,000-kw. unit is 100 lb. higher than on old unit.

STEAM POWER PLANTS

Natural Steam. Power and Boric Acid from Natural Steam in Tuscany. Chem. & Industry, vol. 42, no. 43, Oct. 26, 1923, pp. 1022–1024, 3 figs. Describes large chemical plant, in which volcanic steam is utilized first to produce electrical power and afterwards for manufacture of boric acid.

Remodeling. More Power with Less Coal at Saxony Mills Plant (St. Louis). Power, vol. 58, no. 20, Nov. 13, 1923, pp. 773–774, 1 fig. New chain-grate stokers in enlarged combustion chambers and addition of mixed-pressure turbo-generator to Corliss engine rope-drive plant, improve economy and increase capacity.

STEAM TURBINES

Development. Development of the Steam Turbine, Stanley S. Cook. Roy. Soc. Arts—Jl., vol. 71, nos. 3695, 3696 and 3697, Sept. 14, 21 and 28, 1923, pp. 729–738, 743–760 and 762–770, 33 figs. Sept. 14: Principle of compounding; early indications of directions of progress; marine development with direct-coupled turbines; problem of propeller; combination of turbine and reciprocating engine; passing of direct-coupled marine turbine. Sept. 21: Introduction of mechanical gearing; application to large powers in naval vessels; lubrication of thrust blocks and bearings; mercantile marine turbine; comparison of modern and early efficiencies; methods of attaching blades; reaction and impulse types; progress in economy and output of land turbines; problem of exhaust area. Sept. 28: Application of mechanical gearing to land turbines; geared turbo-generators; geared turbines for mill driving; direct-coupled turbo-alternators; construction of rotors; ventilation of stators; latest improvements in economy of turbines by reheating and cascade feed heating.

High-Pressure. Steam Turbines for High Pressures (Die Dampfturbinen für hohe Drücke), Karl Münichsdorfer. Zeit. des Bayerischen Revisions-Vereins, vol. 27, nos. 17 and 18, Sept. 15 and 30, 1923, pp. 129–130 and 142–143, 5 figs. Discusses change in superstructure of turbine caused by use of high-pressure steam; possibilities of introducing high-pressure turbines in power plants are exemplified.

Marine. See MARINE STEAM TURBINES.

STEEL

Automobile, Failures in. Failures in Steel Parts. Automobile Engr., vol. 13, no. 181, Oct. 1923, pp. 298–299, 10 figs. Notes on causes of breakage in common automobile components.

Chrome-Vanadium. See CHROME-VANADIUM STEEL.

Cold Working. Manufacture of Bright-drawn Bar, Wire, and Cold-rolled Strip. Machy. (Lond.), vol. 23, no. 579, Nov. 1, 1923, pp. 129–133, 8 figs. Production methods employed by Arthur Lee & Sons, Sheffield.

Crystal Structure. Examination of Steel by the X-ray Spectrometer, Hermann H. Zornig. Army Ordnance, vol. 4, no. 20, Sept.-Oct., 1923, pp. 77–83, 4 figs. Evidence shows that, at ordinary temperatures, in plain carbon steels of hypereutectoid composition, crystal structure, as shown by X-ray spectrometer, varies through continuous series from that existing when metal has been very rapidly cooled from temperature in or above critical range to that existing when cooling has been very slow from temperature above critical range.

Seasoning. The Seasoning of Steel, W. P. Wood. Am. Soc. for Steel Treating—Trans., vol. 4, no. 4, Oct. 1923, pp. 488–493. Describes experiment consisting in comparing tensile properties of several varieties of unhardened steel before and after exposure of one year to varying temperature of atmosphere.

Stainless. Stainless Steel, with Particular Reference to the Milder Varieties (Stainless Iron), John H. G. Monypenny. Am. Inst. Min. & Met. Engrs.—Trans., no. 1277-S, Nov. 1923, 17 pp., 18 figs.; also (abstract) in Min. & Metallurgy, vol. 4, no. 203, Nov. 1923, pp. 574–575. Structure and general properties of steel containing 11 to 14 per cent of chromium after different forms of heat treatment and effect on such material of variations in carbon content; effect of variations in composition and heat treatment on resistance to corrosion of such high-chromium steel; special properties produced in such steel when carbon content is reduced to 0.10 per cent.

Surface Hardening. Nitrogen in Iron and Steel: A New Method of Surface Hardening. Iron & Coal Trades Rev., vol. 107, no. 2904, Oct. 26, 1923, p. 624. Data on new method of surface hardening steel by nitrating it and on results of investigation into ferro-nitrogen alloys, from article by Ad. Fry published in Stahl u. Eisen.

Tests. Static and Dynamic Tests for Steel, J. M. Lessells. Am. Soc. for Steel Treating—Trans., vol. 4, no. 4, Oct. 1923, pp. 536–545, 11 figs. Deals with static and dynamic forms of testing, tensile test being taken as representative of former, and repeated shock and fatigue as representative of latter; describes types of shock and fatigue testing machines with experimental results obtained.

The Relation Between the Dynamic and the Static Tensile Tests, Harold Albert Nisley. Army Ordnance, vol. 4, no. 20, Sept.-Oct. 1923, pp. 88–93, 4 figs. Investigation to determine relationship existing between results of static and dynamic tests for each heat treatment, and to show whether this relationship did, or did not, vary as function of structure of material.

STEEL CASTINGS

Acid Electric. Acid Electric Steel Castings, Larry J. Barton. Iron Age, vol. 112, no. 19, Nov. 8, 1923, pp. 1249 and 1299–1301, 1 fig. Cardinal points in good practice; scrap and making bottom; charging and melting down; high-carbon and chrome steel.

Converter vs. Electric. Comparison of Converter and Electric Steel Castings, Thomas Hill. West. Machy. World, vol. 14, no. 10, Oct. 1923, pp. 330–332. Analysis of differences in steels obtained; characteristics of some converter steels.

STEEL, HEAT TREATMENT OF

Critical Point. Changes in Property through Heat Treatment Below Critical Point (Eigenschaftsänderungen durch Wärmebehandlung unterhalb der Umwandlungspunkte), Georg Welter. Stahl u. Eisen, vol. 43, no. 43, Oct. 25, 1923, pp. 1347–1349, 2 figs. Losses through faulty annealing; influence of annealing temperature and duration on mechanical properties of steel wire; constant and gradual cooling in furnace; theoretical conclusions.

Hardening. Nitrogen in Iron, Steel and Special Steel. A New Surface Hardening Process (Stickstoff in Eisen, Stahl und Sonderstahl. Ein neues Oberflächenhärtungsverfahren), Ad. Fry. Stahl u. Eisen, vol. 43, no. 40, Oct. 4, 1923, pp. 1271–1279, 17 figs. Nitration stages of pure iron; structure of iron-nitrogen and iron-nitrogen-carbon systems; development of diagram of state; process of shrinkage-free surface hardening by means of nitration.

Heating and Cooling, Effect of. Changes in Structure Due to Heating and Cooling of Iron with the Aid of Hot Etchings (Beobachtungen über Gefügeänderungen beim Erhitzen und Abkühlen des Eisens mit Hilfe von Heissätzungen), P. Oberhoffer and A. Heger. Stahl u. Eisen, vol. 43, no. 42, Oct. 18, 1923, pp. 1322–1323, 3 figs. Report from Met. Inst. of Tech. Acad. of Aix-la-Chapelle.

Mass, Effect on. The effect of Mass on Heat Treatment, R. S. Gosrow. Forging—Stamping—Heat Treating, vol. 9, no. 10, Oct. 1923, pp. 447–449, 3 figs. Heating and cooling of nickel chrome steel forgings and their physical properties as result of heat treatment.

Quenching Properties. Quenching Properties of Very Soft Steel (Sur la faculté de trempe de l'acier extra-doux à tres haute température), M. Sauvageot and H. Delmas. Académie des Sciences—Comptes Rendus, vol. 176, no. 17, Apr. 23, 1923, pp. 1146–1148. Results of measurement of mechanical properties when a steel containing 0.09 per cent C. was quenched in water at temperatures varying between 950 deg. cent. and melting point; describes experiments on annealing material quenched at high temperatures.

Stainless. Heat-treatment of Steel with Special Reference to Production, J. W. Urquhart. Machy. (Lond.), vol. 23, no. 577, Oct. 18, 1923, pp. 85–87, 1 fig. Stainless steel and iron treatment; forging temperature; hardening and tempering; non-scaling of high-chromium steels; strength of chromium steels after treatment; chrome and useful treatment limit; acid-proof chromes.

Tractor Parts. Heat Treating in a California Tractor Plant. Am. Mach., vol. 59, no. 19, Nov. 8, 1923, pp. 679–681, 5 figs. Illustrations of equipment used, its capacity, and work done; steels used, fuels and way in which work is handled.

STEEL, HIGH-SPEED

Heat Treatment. Hints on Treating High Speed Steel and Its Use for Machining Operations. West. Machy. World, vol. 14, no. 10, Oct. 1923, pp. 320–321 and 323, 3 figs. Discusses forging, annealing, hardening, and drawing of high-speed steel, and importance of careful heating; illustrations of turning and grooving operations of rolls in machine shop of Columbia Steel Co., Pittsburg, Cal.

STEEL MANUFACTURE

Cold-Worked Steel. The Manufacture of Cold-worked Steel. Machy. (Lond.), vol. 23, nos. 575, 576 and 577, Oct. 4, 11, and 18, 1923, pp. 1–9, 33–38 and 70–71, 23 figs. Methods employed by Kayser, Ellison & Co., Sheffield, England, in production of wire, bar and strip from high-grade crucible and electric alloy steels.

STREET RAILWAYS

Cars. A Brill New Single Truck. Tramway & Ry. World, vol. 54, no. 19, Oct. 18, 1923, pp. 209–211 4 figs. Describes 79-E-X truck made by J. G. Brill Co.; carries body, without increasing wheelbase, in such a manner as to give it stability equal to another 1 ft. 6 in. wheelbase.

A Modern Street Car (Ein moderner Strassenbahnwagen), Jos. Westhues. Verkehrstechnik, vol. 40, no. 36, Sept. 7, 1923, pp. 309–313, 10 figs. Dimensions and details of car type designed for Krefeld street railway; design is based on all experiences made in last 10 years and on standards issued by standard committees of Assn. German Street and Narrow-Gage Railways.

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Alphabetical List on page 168

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Double-End Pay-as-You-Pass Car Introduced in Brooklyn. Elec. Ry. Jl., vol. 62, no. 17, Oct. 27, 1923, pp. 739–742, 7 figs. Details of new front-entrance center-exit car of Brooklyn City Railroad, 200 of which are being placed in service; novel scheme of exterior painting attracts attention; variable load brakes and electro-pneumatic door control used.

Street-Railway Cars. Elec. Ry. Jl., vol. 62, no. 13, Sept. 29, 1923. Contains following articles: Broad Trend of Car Development, pp. 473–474; Present Body Design Tendencies, pp. 475–481, 8 figs.; Facilities for Expediting Passenger Movement, pp. 482–490, 23 figs.; New Methods in Body Construction, pp. 491–501, 25 figs.; Advances in Car Lighting, Heating and Ventilating, pp. 502–510, 17 figs.; Mechanical and Electrical Equipment, pp. 511–519 and 536, 30 figs.; Interchangeability and Standardization, pp. 520–522, 2 figs.; Incorporating Merchandising Features in Design, pp. 523–528, 10 figs.; Cars for Use in Train Operation, pp. 529–536, 14 figs.

The Application of the Light-Weight Double-Truck Car, H. C. Hickock. Elec. Jl., vol. 20, no. 10, Oct. 1923, pp. 356–360, 5 figs. Describes two typical light-weight cars as examples which have successfully met conditions for which they were built.

Track. Concrete Foundations, Robert B. Holt. Tramway & Ry. World, vol. 54, no. 19, Oct. 18, 1923, pp. 219–222, 2 figs. Consideration of strength, suitability and permanence of concrete foundations for tramway tracks. Mixing water; grading of aggregates; characteristics of sand; proper maturing; trass or puzzolana; ciment fondu.

STRESSES

Optical and Mechanical Determination. The Determination of Stresses at a Point in a Plate, E. G. Coker. Engineering, vol. 116, no. 3016, Oct. 19, 1923, pp. 512–514, 6 figs. Comparison of experimental methods for obtaining stress at point in plate by optical and mechanical methods. Communicate to Brit. Assn.

Optical Recorders. Optical Stress-Strain Recorders. Engineer, vol. 136, no. 3540, Nov. 2, 1923, pp. 479–480. Discusses Dalby's device which, in its present form, consists of two mirrors mounted on axes at right angles to each other, whereby ray of light from point source is reflected through lens and focused on photographic plate.

SUPERHEATED STEAM

Developments. Superheating, John Neill. Inst. Mar. Engrs.—Trans., vol. 35, Oct. 1923, pp. 288–320 and (discussion) 320–329, 35 figs. Deals with recent developments.

SURGE TANKS

Spillway Combined with. Surge Tank and Spillway Combined on Pit River Plant No. 1. Eng. News-Rec., vol. 91, no. 16, Oct. 18, 1923, pp. 630–632, 4 figs. Heavily reinforced cylinder 60 ft. in diam. provides 1800 sec-ft. spillway capacity between tunnel and penstock.

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TERMINALS, LOCOMOTIVE

Design. Locomotive Terminals. West. Soc. Engrs.—Jl., vol. 28, no. 9, Sept. 1923, pp. 373–390 and (discussion) 390–394, 2 figs. Contains following papers: Operating Department Requirements, R. N. Begien; Mechanical Department Requirements, L. K. Sillcox; Design of Railway Locomotive Terminals, W. T. Krausch.

TERMINALS, RAILWAY

Chicago Union Station. The Chicago Union Station, Its Design and Construction, J. D'Esposito. West. Soc. Engrs.—Jl., vol. 28, no. 9, Sept. 1923, pp. 357–372, 7 figs. Records important features of planning and execution of work embraced in general rearrangement of railway facilities known as Chicago Union Station project.

Design and Developments. Railroad Terminals. Am. Soc. Civil Engrs.—Proc., vol. 49, no. 7, Sept. 1923, pp. 1455–1606, 61 figs. Symposium containing following papers: Principles of Terminal Station Design, Alfred Fellheimer; Railroad Freight Terminal Problem in St. Louis, Missouri, Charles E. Smith; Street Development in Relation to Railroad Terminals, Jacob L. Crane, Jr.; Chicago Terminal Improvements, Illinois Central Railroad, D. J. Brumley; Chicago Terminal Improvements, Dearborn Station Group, Frederick E. Morrow; Chicago Terminal Improvements, Chicago, Rock Island and Pacific and New York Central Railways, Robert H. Ford; Chicago Union Station Development, J. D'Esposito; Modern Rail and Water Terminals with Reference to Chicago, Rufus W. Putnam; Modern Freight Terminal of the Pennsylvania Railroad System in Chicago, Ill., William L. R. Haines.

Freight. New Freight House Provides Special Service. Ry. Age, vol. 75, no. 18, Nov. 3, 1923, pp. 803–806, 7 figs. Layout and facilities of Union Pacific terminal at Los Angeles.

TEXTILE MILLS

Electric Drive. Motor Drive in Old Mills, H. W. Reding. Textile World, vol. 64, no. 14, Oct. 6, 1923, pp. 85, 87, 89, 119 and 121, 3 figs. Proportion of electrically driven spindles in southern States; varied power problems in mills; drives and methods of applying motors; typical layout in recently electrified mill; cost of applying motors in old mill; source of power and steam for processes.

THREADING MACHINES

Double-End. New Double-End Threading Machine Operates Automatically. Automotive Industries, vol. 49, no. 16, Oct. 18, 1923, pp. 792–793, 2 figs. Has capacity for work up to ⅜ in. in diam. and 10 in. length; work fed intermittently from magazine at rear to position in line with die heads; power transmission through two-step cone pulley; built by Grant Mfg. & Machine Co.

TIDAL POWER

Utilization. The Utilization of Tides for the Production of Power for the Working and Lighting of Ports and for Maritime Works (Working of Lock-Gates, etc.), Alejandro Yanquez. World Ports, vol. 11, no. 11, Sept. 1923, pp. 48–55. Points out that when constructing works of ports, construction should be studied of closed docks and moles, with view to forming at one and same time perfect shelters and utilization of natural power of tides. Paper before Int. Congress of Navigation, London.

TINPLATE

Manufacture. The Tinplate Trade: Modern Machinery, H. Spence Thomas. South Wales Inst. Engrs.—Proc., vol. 38, no. 8, Sept. 26, 1923, pp. 669–689 and (discussion) 689–721, 8 figs. Developments in tinplate manufacture in England.

TIRES, RUBBER

Balloon. International Balloon Tire and Rim Standards Are Proposed, Colin Macbeth. Automotive Industries, vol. 49, no. 19, Nov. 8, 1923, pp. 949–952, 7 figs. Points out that disadvantages of existing straight side and clincher equipment can be overcome by adoption of drop base popular in Europe; narrow seats tend to make diameter larger.

Fabric Stresses in. Fabric Stresses in Pneumatic Tires, H. F. Schippel. Indus. & Eng. Chem., vol. 15, no. 11, Nov. 1923, pp. 1121–1131, 26 figs. Mathematical analysis of fabric stresses in pneumatic-tire carcasses.

Types for 1924. Tyres for 1924. Autocar, vol 51, no. 1461, Oct. 19, 1923, pp. 711–713, 7 figs. Advent of cushion tires; results obtained with latest design of cord cover in racing and touring.

TOLERANCES

German Standards. German Standards for Tolerances and Allowances in Machine Fits, Oscar R. Wikander. Am. Mach., vol. 59, nos. 19 and 20, Nov. 8 and 15, 1923, pp. 685–689 and 733–737, 12 figs. Presents standard sheets known as Dinorms issued by German Indus. Standards Committee. See also no. 21, Nov. 22, pp. 761–763, 3 figs.

Large. Large Tolerances; Their Influence on Determining the Dimensions of Structural Parts (Grosztoleranzen; ihr Einflusz auf die Maszbestimmung von Konstruktionsteilen), Th. Damm. Werkstattstechnik, vol. 17, no. 19, Oct. 1, 1923, pp. 565–570, 14 figs. Investigation, based on examples of machine and especially locomotive construction, to determine extent to which principles of German standard fit system (DIN) can be applied to the determinations of large tolerances.

TOOL MAKING

Standards for. The Manufacture of Tools and Fixtures (Die Werkzeugmacherei und der Vorrichtungsbau), Karl Haase. Werkstattstechnik, vol. 17, nos. 17 and 18, Sept. 1 and 15, 1923, pp. 513–520 and 553–556, 20 figs. Economic production by means of special tools and fittings with aid of corresponding Standards. Presents Standard sheets for various fittings.

TRANSPORTATION

Railway. Railroad Transportation. Am. Soc. Civil Engrs.—Proc., vol. 49, no. 7, Sept. 1923, pp. 1406–1454, 8 figs. Symposium containing following papers: Some Phases of Present-Day Railroad Transportation, John W. Kendrick; Transportation as Related to National Development, J. G. Sullivan; Railroads—The Arteries of Commerce, J. Rowland Bibbins; Federal Valuation of Railroads, Charles A. Morse; Consolidation of Railroads, John S. Worley.

TUBES

Butt Welding. Minimizing Distortion in Welding of Tubing, Marcel Piette. Can. Machy., vol. 30, no. 15, Oct. 11, 1923, pp. 22 and 24, 5 figs. Expansion of pieces in opposite sense beneficial; hammering during process on thick material and after welding on thin material diminishes contraction. Translated from Revue de la Soudure Autogene.

TUBING

Chrome-Molybdenum Steel. Physical Properties of Chrome-Molybdenum Steel Tubing, S. W. Thompson. Air Service Information Circular, vol. 5, no. 445, Aug. 1, 1923, 16 pp., 11 figs. Investigation to determine variation in physical characteristics of three sizes of chrome-molybdenum steel tubing after quenching and drawing.

V

VALVE GEARS

Small Turbines. Valve Gears on Small Westinghouse Direct-Driven Turbines. Power, vol. 58, nos. 19 and 20, Nov. 6 and 13, 1923, pp. 730–731, and 770–773, 6 figs. Describes two general types, one for sets up to 15 kw. which uses horizontal governor mounted on shaft, and second type which is applied to geared turbines and utilizes comparatively low-speed vertical governor geared to slow-speed shaft.

VAPORS

Pressure Measurements. Applications of Vapor Pressure Measurements, H. S. Davis and Mary D. Davis. Indus. & Eng. Chem., vol. 15, no. 10, Oct. 1923, pp. 1075–1077, 1 fig. Vapor-pressure apparatus consists of two similar glass flasks connected to manometer tube and means whereby sealed glass containers full of liquids may be broken inside flasks; details of manipulation of such a device.

VIBRATIONS

Tests. Determination of Mechanical Performance by Means of Vibration Tests, C. Bethel. Elec. Jl., vol. 20, no. 10, Oct. 1923, pp. 371–373, 5 figs. Results of tests show great value of reproducing service vibrations experimentally to determine ability of piece of apparatus to meet actual service requirements.

VISCOSIMETERS

Standardization. The Standardization of Commercial Viscometers, Madison L. Sheely. Indus. & Eng. Chem., vol. 15, no. 11, Nov. 1923, pp. 1109–1114, 9 figs. Discusses need of standardization and advisability of expressing results in absolute units; gives calibration, set up, and operation of typical glass outflow type of viscometer, together with comparisons of various other similar types; data showing comparative results of viscosity determinations on various instruments; liquids and solutions suitable for standardization of commercial types of viscometers.

W

WAGES

Incentive Systems. Wage-Incentive Systems, Eugene Bouton. Soc. Automotive Engrs.—Jl., vol. 13, no. 5, Nov. 1923, pp. 380–383, 6 figs. Describes system involving group-piece-work plan for major assembly units and machining departments, and straight individual piece work for small parts; piece-work prices are established from data obtained in elemental time study, record of which is shown.

Wage-Incentive Plans for Cost Control, R. W. Darnell. Management & Administration, vol. 6, no. 4, Oct. 1923, pp. 459–466. Points out that properly planned wage-incentive system not only enables manufacturer to know exactly what his direct labor costs should be but if they exceed this enables him to tell just where increased cost was incurred, or its cause.

International Rates. Internation Rates of Wages in the Engineering Industry, Hugh Quigley. Beama, vol. 13, no. 67, Nov. 1923, pp. 278–284. Position of Britain in international competition.

WATER ELEVATORS

Developments. Recent Developments in Water Elevators, G. C. Gowlland. Roy. Engrs. Jl., vol. 37, no. 3, Sept. 1923, pp. 389–394, 5 figs. Describes canvas belt, Chaine-Hélice and Boulton water elevators.

WEIGHTS AND MEASURES

Length Measurements. Precise Length Measurements, J. E. Sears. Roy. Soc. Arts—Jl., vol. 71, nos. 3698, 3699 and 3700, Oct. 5, 12 and 19, 1923, pp. 775–791, 793–818 and 819–841, 49 figs. Oct. 5: Control of basic standards. Oct. 12: Determination of derived standards. Oct. 19: Practical applications.

WELDING

Apparatus, London Exhibition. British Welding Exhibition, Lorn Campbell, Jr. Welding Engr., vol. 8, no. 10, Oct. 1923, pp. 23–25, 6 figs. Report of welding exhibitions at Shipping, Engineering and Machinery Exhibition recently held at London, Eng.

Applications. Industrial Applications of Welding and Cutting and Their Possibilities, Am. Welding Soc.—Jl., vol. 2, no. 10, Oct. 1923, pp. 9–45, 38 figs. Possibilities of welding as a fabricating process and in repair field; describes applications of arc welding, electric arc cutting, oxy-acetylene welding, oxy-acetylene cutting, resistance welding, and thermit welding.

Piping, Power-Plant. The Use of Welding in Power-Plant Piping, Lewis J. Sforzini. Power, vol. 58, no. 21, Nov. 20, 1923, pp. 798–802, 12 figs. Results of author's experiences in extensive use of welded piping installations.

Processes. The Present Status of Welding Processes (Der gegenwärtige Stand der Schweissverfahren). Zeit. des Bayerischen Revisions-Vereins, vol. 27, nos. 14, 15 and 16, July 31, Aug. 15 and 31, 1923, pp. 105–106, 115–117 and 124–125. Fire, water-gas, thermit, electric, and autogenous welding processes.

[See also ELECTRIC WELDING, ARC; ELECTRIC WELDING, RESISTANCE; OXY-ACETYLENE WELDING.]

WINDMILLS

Drive for Dynamo. Wind-Driven Electric Lighting Plant. Engineering, vol. 116, no. 3018, Nov. 2, 1923, p. 571, 5 figs. Describes Lambert plant, consisting of wind wheel carried at top of lattice mast and driving a dynamo through chain gear.

Theory. General Theory of Windmills, Max M. Munk. Nat. Advisory Committee for Aeronautics—Tech. Notes, no. 164, Oct. 1923, 7 pp., 2 figs. Discusses application of slip-curve method to design and analysis of windmills.

WORKMEN'S COMPENSATION

Legislation, United States and Canada. Workmen's Compensation Legislation of the United States and Canada 1920 to 1922, Lindley D. Clark. U. S. Bur. of Labor Statistics—Bul. (Workmen's Insurance & Compensation Series) no. 332, June 1923, 260 pp. Workmen's compensation laws of United States and Canada.

For a full flow of clean water BRASS PIPE is necessary

This picture was taken in a laundry—one of the wettest businesses we know of. Tremendous quantities of water are used every day, and to keep it clean—free from rust—Brass Pipe is employed throughout.

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(See also page 112 of this issue for supplementary items.)

ABRASIVE WHEELS

Bond Tenacity. Grinding Wheel Bond Tenacity, Robert J. Spence. Abrasive Industry, vol. 4, no. 12, Dec. 1923, pp. 351 and 355. Function of bonding material, and effects of varying work and wheel speeds.

Types. Notes on Abrasives and Abrasive Wheels, W. E. Murphy. Machy. (Lond.), vol. 23, no. 581, Nov. 15, 1923, pp. 207–208. Natural and artificial abrasives; rubber-bonded and silicate wheels.

AERONAUTICAL INSTRUMENTS

Control Indicator. Reid Control Indicator for Aeroplanes, J. Robinson. Jl. of Sci. Instruments, Preliminary Number, May 1922, pp. 22–24, 3 figs. Describes control indicator having indications of bubble, turn indicator and air speed indicator in one compact case, indications of bubble and turn indicator being in form of lights, red, white or green.

Height of Aircraft from Ground. The Measurement of True Height by Aneroid. L. N. G. Filon. Jl. of Sci. Instruments, vol. 1, no. 1, Oct. 1923, pp. 1–8, 3 figs. Deals with devices for obtaining approximately true height of aircraft from ground, on assumption that law of temperature is approximately known, of class which retains present mechanism but enables pointer to read correct height (without a calculating device) on a special type of dial; describes two types of dial which give a direct reading of "lapse-rate" height with considerable accuracy.

AERONAUTICS

Bibliography. Bibliography of Aeronautics 1917–1919, Paul Brockett. Nat. Advisory Committee for Aeronautics, 1923, 494 pp. Covers literature published from Jan. 1, 1917, to Dec. 31, 1919, and continues work of Smithsonian Miscellaneous Collections covering material published prior to June 30, 1909, and work of Nat. Advisory Committee published in Bibliography of Aeronautics for years 1909 to 1916.

AIR COMPRESSORS

Automatic Electric Drive. Automatic Electric Drive of Medium-Size Piston Compressors (Selbsttätiger elektrischer Betrieb mittlerer Kolbenkompressoren), R. Rückert. Fördertechnik u. Frachtverkehr, vol. 16, nos. 21 and 22, Nov. 3 and 18, 1923, pp. 242–243 and 249–252, 11 figs. Describes automatic device for starting without load developed by German Gen. Elec. Co. (AEG), and its field of application; it is shown that highest degree of efficiency is obtained from compressed-air plant with use of this device.

Multitubular Isothermal. Multitubular Isothermal Compressors (Les compresseurs multitubulaires isothermiques et leurs applications), L. Neu. Revue de l'Industrie Minérale (Comptes Rendus), no. 66, Sept. 15, 1923, pp. 189–196, 2 figs. Points out that isothermal compression involves expenditure of much less energy than is required for diabatic compression, and avoids practical difficulties associated with temperature rise; by substituting multitubular cylinders and pistons for those of ordinary compressor, output can be increased 20 per cent for same power consumption.

AIR PUMPS

Water-Jet. Adaptability of Water-Jet Air Pumps for the Removal of Air from Surface Condensers (Eigenschaften der Wasserstrahl-Luftpumpen für das Entlüften von Oberflächenkondensatoren), Fritz L. Richter. Zeit. des Vereines deutscher Ingenieure, vol. 67, no. 45, Nov. 10, 1923, pp. 1042–1045, 7 figs. Results of experiments made with water-jet apparatus driven by pressure water to determine absorption of dry as well as moisture-containing air; based on these experimental results and well as those of Höfer with steam-jet apparatus, it is shown how both apparatus behave when removing air from surface condensers; utilization of exhaust steam from both apparatus.

AIRCRAFT

Launching from Ships. The Launching of Aircraft from Ships, L. J. Wackett. Roy. Aeronautical Soc.—Jl., vol. 27, no. 155, Nov. 1923, pp. 553–556, 1 fig. Investigation to find minimum propeller thrust necessary to enable aircraft (particularly seaplane or flying boat) of known weight and fineness, to take off from railway platform, on ship steaming at given speed.

AIRCRAFT CONSTRUCTION MATERIALS

Wing Coverings. Experiments with Fabrics for Covering Airplane Wings, to Determine Effect of Method of Installation, A. Pröll. Nat. Advisory Committee for Aeronautics—Tech. Notes, no. 168, Dec. 1923, 49 pp., 23 figs. Notes relating primarily to effect of changes in loading and in disposition of supporting framework (regarded as rigid) on covering fabric. Translated from Technische Berichte, vol. 3, no. 6.

AIRPLANE PROPELLERS

Slipstream, Effect of. Reduction in Efficiency of Propellers Due to Slipstream, Max M. Munk. Nat. Advisory Committee for Aeronautics—Tech. Notes, no. 170, Dec. 1923, 6 pp. Simple method of calculation. Translated from Technische Berichte, vol. 3, no. 7.

Tests, Analysis of. Analysis of W. F. Durand's and E. P. Lesley's Propeller Tests, Max M. Munk. Nat. Advisory Committee for Aeronautics—Report, no. 175, 1923, 14 pp., 22 figs. Critical study of propeller model tests with view of obtaining clear insight into mechanism of propeller action and of examining soundness of physical explanation generally given.

AIRPLANES

Air Resistance. Air Resistance Measurements on Actual Airplane Parts, C. Wieselsberger. Nat. Advisory Committee for Aeronautics—Tech. Notes, no. 169, Nov. 1923, 16 pp., 21 figs. Data relate to following experimental objects: Landing gear of Siemens-Schuckert DI airplane; landing gear of "Luftfahrzeug-Gesellschaft" airplane, type Roland D11a; Landing gear of "Flugzeugbau Friedrichshafen" G airplane; machine gun; exhaust manifold of 260-hp. engine. Translated from Technische Berichte, vol. 3, no. 7.

Chinese-Built. The "Schoettler I" Biplane. Flight, vol. 15, no. 44, Nov. 1, 1923, pp. 675–676, 3 figs. Describes 2-seater tractor biplane fitted with 160-hp. Mercedes water-cooled engine built by German engineer in China at the Lunghwa aerodrome.

Flying Boats. See FLYING BOATS.

Handasyde. The Handasyde Light 'Plane. Flight, vol. 15, no. 38, Sept. 20, 1923, pp. 563–566, 13 figs. A miniature monoplane, with wing resting on top of fuselage and pilot placed in a cut-out portion of trailing edge; fuselage of rectangular section terminating at stern in a horizontal knife-edge; 750 cc. Douglas flat-twin air-cooled engine; length 19 ft. 2 in., span 30 ft.

Heinkel. A New German Airplane (Eine neue deutsche Flugzeugkonstruktion), Alex. Büttner. Motorwagen, vol. 26, no. 28, Oct. 10, 1923, pp. 421–422, 1 fig. Small strutless monoplane built entirely of wood which can be used as land or seaplane; designed and built by Heinkel Airplane Works, Warnemünde known as Type H. E. 3.

Internally Braced. Design of Internally Braced Biplane Wings, A. S. Niles. Air Service Information Circular, vol. 5, no. 440, May 1, 1923, 31 pp., 15 figs. Describes properties of internally braced biplanes and indicates proper method of design.

Light. Gliders and Light Planes, A. Ogilvie. Roy. Aeronautical Soc.—Jl., vol. 27, no. 155, Nov. 1923, pp. 524–528 and (discussion) 528–534. Author discusses results which may be looked for from light plane; he believes it should be possible to develop propeller system which would enable full power of engine to be effectively used from time it is opened up, give steep angle to climb, be efficient at top speed and at same time act as air brake when gliding down without engine.

The English Light Plane Meeting at Lympne. Aviation, vol. 15, no. 21, Nov. 19, 1923, pp. 622–625, 2 figs. Performances: Speed, 76.5 mi-hr.; ceiling, 14,400 ft.; economy, 87.5 mi-gal.; details of competing planes.

The Light 'Plane Competitions at Lympne, Oct. 8–13. Flight, vol. 15, nos. 40 and 41, Oct. 4 and 11, 1923, pp. 602–611, 26 figs., and 618–628, 20 figs. Description of machines entered, and account of performances.

Racers. The Avus Race and Its Airplanes (Das Avus-Rennen und seine Fahrzeuge). Motorwagen, vol. 26, no. 29–30, Oct. 20–31, 1923, pp. 431–432. Description of participating machines and their behavior during race at Berlin-Grunewald race track.

Seaplanes. See SEAPLANES.

Sport. The Albatros Sporting Types L. 59 and L. 60. Flight, vol. 15, no. 37, Sept. 13, 1923, pp. 543–544, 2 figs. Notes on a single-seater, with 50–60-hp. Siemens radial engine, known as type L. 59, and a two-seater, with 90–100-hp. engine of same make known as type L. 60.

Stability. The Problem of the Stability of Airplanes (Le problème de la stabilité des avions), L. Breguet and R. Devillers. Technique Moderne, vol. 15, no. 19, Oct. 1, 1923, pp. 577–582, 6 figs. Clarifying discussion of fundamental principles involved.

Training. A Belgian Airplane (Un avion belge), A. Renard. Association des Ingénieurs Sortis de l'Ecole Polytechnique de Bruxelles, vol. 19, no. 1, 1923, pp. 3–19, 12 figs. Details of an improved 90-hp. biplane designed especially for training purposes, but easily capable of performing all "stunt" evolutions.

Variable Gearing. The Effect of Variable Gearing on Aeroplane Performance, Annie D. Betts. Roy. Aeronautical Soc.—Jl., vol. 27, no. 155, Nov. 1923, pp. 557–560. Author states that it appears to be possible to construct combination of variable gear and airscrew which will allow of machine being flown at nearly constant speed at all heights, while engine revolutions are kept at (or close to) any chosen value.

Vickers. The Vickers "Viget" Light 'Plane. Flight, vol. 15, no. 38, Sept. 20, 1923, pp. 559–562, 15 figs. Perfectly orthodox biplane, using normal bracing and having R. A. F. 15 wing section; 750-cc. Douglas flat twin air-cooled engine; length 17 ft. 3 in., height 7 ft. 3 in.

Wind-Tunnel Tests. Wind Tunnel Tests of Five Strut Sections in Yaw, Edward P. Warner. Nat. Advisory Committee for Aeronautics—Tech. Notes, no. 167, Nov. 1923, 13 pp., 6 figs. Models were made at McCook Field and tested in old wind tunnel of Mass. Inst. of Technology.

Copyrigt, 1924, THE AMERICAN SOCIETY OF MECHANICAL ENGINEERS

NOTE.—The abbreviations used in indexing are as follows:

Academy (Acad.)
American (Am.)
Associated (Assoc.)
Association (Assn.)
Bulletin (Bul.)
Bureau (Bur.)
Canadian (Can.)
Chemical or Chemistry (Chem.)
Electrical or Electric (Elec.)
Electrician (Elecn.)
Engineer[s] (Engr.[s])
Engineering (Eng.)
Gazette (Gaz.)
General (Gen.)
Geological (Geol.)
Heating (Heat.)
Industrial (Indus.)
Institute (Inst.)
Institution (Instn.)
International (Int.)
Journal (Jl.)
London (Lond.)
Machinery (Machy.)
Machinist (Mach.)
Magazine (Mag.)
Marine (Mar.)
Materials (Matls.)
Mechanical (Mech.)
Metallurgical (Met.)
Mining (Min.)
Municipal (Mun.)
National (Nat.)
New England (N. E.)
Proceedings (Proc.)
Record (Rec.)
Refrigerating (Refrig.)
Review (Rev.)
Railway (Ry.)
Scientific or Science (Sci.)
Society (Soc.)
State names (Ill., Minn., etc.)
Supplement (Supp.)
Transactions (Trans.)
United States (U. S.)
Ventilating (Vent.)
Western (West.)

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FOR ALPHABETICAL LIST OF ADVERTISERS, SEE PAGE 140

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(See Compressors, Receivers, etc., Air)

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* Carrier Engineering Corp'n
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* Taylor Instrument Cos.

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Gurney Ball Bearing Co.
* Gwilliam Co.
* New Departure Mfg. Co.
* Norma Co. of America
* S K F Industries (Inc.)
* U. S. Ball Bearing Mfg. Co.

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* New Departure Mfg. Co.

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* Hyatt Roller Bearing Co.
* Norma Co. of America
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* American Blower Co.
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Blowers, Forge
* Sturtevant, B. F. Co.

Blowers, Pressure
* American Blower Co.
* Clarage Fan Co.
Lammert & Mann Co.
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Blowers, Rotary
Fletcher Works
Lammert & Mann Co.
* Schutte & Koerting Co.
* Sturtevant, B. F. Co.

Blowers, Soot
Diamond Power Specialty Corp'n
* Sturtevant, B. F. Co.

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* McLeod & Henry Co.

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(See Coverings, Furnaces, Tube Cleaners, etc., Boiler)

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* O'Brien, John Boiler Works Co.
* Titusville Iron Works Co.

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* Casey-Hedges Co.
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* O'Brien, John Boiler Works Co.
* Vogt, Henry Machine Co.
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* Casey-Hedges Co.
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Herbert Boiler Co.
* Keeler, E. Co.
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Lidgerwood Mfg. Co.
* O'Brien, John Boiler Works Co.
* Titusville Iron Works Co.
* Union Iron Works
* Walsh & Weidner Boiler Co.

Boilers, Locomotive
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* Casey-Hedges Co.
* Keeler, E. Co.
* Leffel, James & Co.
* Titusville Iron Works Co.
* Union Iron Works
* Walsh & Weidner Boiler Co.

Boilers, Marine (Scotch)
* Brownell Co.
* Casey-Hedges Co.
* Leffel, James & Co.
* Titusville Iron Works Co.
* Walsh & Weidner Boiler Co.

Boilers, Marine (Water Tube)
* Babcock & Wilcox Co.
* Casey-Hedges Co.
* Connelly, D. Boiler Co.
* O'Brien, John Boiler Works Co.
* Springfield Boiler Co.
* Titusville Iron Works Co.
* Walsh & Weidner Boiler Co.
* Ward, Charles Engineering Wks.

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* Brownell Co.
* Casey-Hedges Co.
* Erie City Iron Works
* Frick Co. (Inc.)
Herbert Boiler Co.
* Keeler, E. Co.
* Leffel, James & Co.
Lidgerwood Mfg. Co.
* O'Brien, John Boiler Works Co.
* Titusville Iron Works Co.
* Union Iron Works
* Walsh & Weidner Boiler Co.

Boilers, Tubular (Horizontal Return)
* Bigelow Co.
* Brownell Co.
* Casey-Hedges Co.
* Cole, R. D. Mfg. Co.
* Connelly, D. Boiler Co.
* Erie City Iron Works
Herbert Boiler Co.
* Keeler, E. Co.
* Leffel, James & Co.
Lidgerwood Mfg. Co.
Morrison Boiler Co.
* O'Brien, John Boiler Works Co.
* Titusville Iron Works Co.
* Union Iron Works
* Vogt, Henry Machine Co.
* Walsh & Weidner Boiler Co.
* Ward, Charles Engineering Wks.
* Webster, Howard J.
* Wickes Boiler Co.

Boilers, Tubular (Vertical Fire)
* Bigelow Co.
* Brownell Co.
* Casey-Hedges Co.
Clyde Iron Works Sales Co.
* Keeler, E. Co.
* Leffel, James & Co.
Lidgerwood Mfg. Co.
Morrison Boiler Co.
* O'Brien, John Boiler Works Co.
* Titusville Iron Works Co.
* Union Iron Works
* Walsh & Weidner Boiler Co.

Boilers, Water Tube (Horizontal)
* Babcock & Wilcox Co.
* Casey-Hedges Co.
* Cole, R. D. Mfg. Co.
* Connelly, D. Boiler Co.
* Edge Moor Iron Co.
* Erie City Iron Works
Herbert Boiler Co.
* Keeler, E. Co.
* Ladd, George T. Co.
Morrison Boiler Co.
* O'Brien, John Boiler Works Co.
* Springfield Boiler Co.
* Union Iron Works
* Vogt, Henry Machine Co.
* Walsh & Weidner Boiler Co.
* Wickes Boiler Co.

Boilers, Water Tube (Inclined)
* Babcock & Wilcox Co.
* Bigelow Co.
* Casey-Hedges Co.
* Keeler, E. Co.
* Ladd, George T. Co.
Morrison Boiler Co.
* O'Brien, John Boiler Works Co.
* Vogt, Henry Machine Co.
* Walsh & Weidner Boiler Co.
* Ward, Charles Engineering Wks.

Boilers, Water Tube (Vertical)
* Babcock & Wilcox Co.
* Bigelow Co.
* Casey-Hedges Co.
* Erie City Iron Works
* Keeler, E. Co.
* Ladd, George T. Co.
Morrison Boiler Co.
* O'Brien, John Boiler Works Co.
* Walsh & Weidner Boiler Co
* Wickes Boiler Co.

Boxes, Carbonizing
Driver-Harris Co.

Boxes, Case Hardening
Driver-Harris Co.

Boxes, Water Service
Murdock Mfg. & Supply Co.

Brake Blocks
Johns-Manville (Inc.)

Brakes, Air
* Allis-Chalmers Mfg. Co.
* General Electric Co.

Brass Goods
* Scovill Mfg. Co.

Brass Mill Machinery
Farrel Foundry & Machine Co.

Breechings, Smoke
* Brownell Co.
Morrison Boiler Co.
* Titusville Iron Works Co.
* Vogt, Henry Machine Co.

Brick, Fire
* Bernitz Furnace Appliance Co.
* Celite Products Co.
* Drake Non-Clinkering Furnace Block Co.
Keystone Refractories Co.
* King Refractories Co. (Inc.)
* McLeod & Henry Co.

Brick Insulating
* Celite Products Co.
* Quigley Furnace Specialties Co.

Bridges, Coal & Ore Handling
* Brown Hoisting Machinery Co.
Link-Belt Co.

Bridgewalls (Furnace)
* McLeod & Henry Co.

Buckets, Elevator
* Brown Hoisting Machinery Co.
Chain Belt Co.
* Gifford-Wood Co.
* Hendrick Mfg. Co.
* Jones, W. A. Fdry. & Mach. Co.
Link-Belt Co.

Buckets, Grab
* Brown Hoisting Machinery Co.
Clyde Iron Works Sales Co.

*Catalogue data of firms marked * appear in the A.S.M.E. Condensed Catalogues of Mechanical Equipment, 1923-24 Volume*

AIRSHIPS

Hangars. See HANGARS.

Metal- vs. Fabric-Clad. Metal-Clad versus Fabric-Covered Rigid Airships, R. Upson. Aviation, vol. 15, no. 24, Dec. 10, 1923, pp. 702–703. Points out that metal envelope has advantage of fire-resisting quality, greater gas tightness, durability and lesser weight.

Photoelastic Tests. Photoelastic Method Applied to Rigid-Airship Research, Thos. H. Frost. Soc. Automotive Engrs.—Jl., vol. 13, no. 6, Dec. 1923, pp. 497–498, 2 figs. Account of photoelastic tests carried out at Mass. Inst. of Technology on model of ZR1, to determine stress distribution with ship in flight

Water-Ballast Recovery. Water Ballast Recovery for Airships, Ira F. Travel. Aviation, vol. 15, no. 21, Nov. 19, 1923, pp. 625–626, 2 figs. History of development; describes condenser developed by Bur. of Standards and Army Air Service, which consists of series of long slender pipes or tubes through inside of which gas is conducted on its way from exhaust manifolds of engine to atmosphere.

Zeppelin. The Zeppelin Passenger Airship LZ, 126. Engineer, vol. 136, no. 3545, Dec. 7, 1923, pp. 604–605, 9 figs. partly on supp. plate and p. 616. Constructional details of airship approaching completion in works of Zeppelin Co., Friedrichshafen, Germany.

ALIGNMENT CHARTS

Graphic Utilization. Simple Method for Graphic Utilization of Alignment Charts Without Calculation (Einfaches Verfahren zur zeichnerischen Auswertung von Liniendiagrammen ohne Rechnung), Paul Ertl. Zeit. für das Berg-, Hütten- u. Salinenwesen, vol. 71, no. 2, 1923, pp. 175–179, 2 figs. Describes method developed by author for determination of derived values from basic values.

ALLOY STEELS

Automobile Construction. Steels for Automobile Construction (Kraftwagen-Baustähle). Motor u. Auto, vol. 20, no. 18, Sept. 25, 1923, pp. 156–159. Describes special steels manufactured by Böhler Bros. & Co., with special reference to nickel and chrome-nickel steels.

Fracture. Faults in Alloy Steel (Ueber Fehlstellen in legiertem Stahl), A. Schleicher. Stahl u. Eisen, vol. 43, no. 47, Nov. 22, 1923, pp. 1449–1452. It is shown that fractures known as flasks are due to presence of solid oxidic slag enclosures.

Krupp. Krupp Steels for Tools and Steel Products (Krupps Stahle für Werkzeuge and Stahlwaren), H. Schilling. Kruppsche Monatshefte, vol. 4, July-Aug. 1923, pp. 123–132, 7 figs. History of their development; recent developments in manufacture of tool and alloy steels.

ALLOYS

Aluminum. See ALUMINUM ALLOYS.

Bearing Metals. See BEARING METALS.

Brass. See BRASS.

Cast. The Use of Cast Alloys for the Working Parts of Machinery, Pisek. Foundry Trade Jl., vol. 28, nos. 374, 375 and 376, Oct. 18, 25 and Nov. 1, 1923, pp. 325–329, 349–351 and 369–376, 61 figs. Physical properties of alloys; cooling considerations; influence of impurities and overheating; liquation; physical changes by alloying; how metals solidify; deoxidizers; contraction; piping and blowholes; alloys of copper; deoxidizing copper alloys; brasses; aluminum bronzes; anti-friction alloys; aluminum alloys. From paper presented to Paris Int. Foundry conference.

Chrome - Molybdenum. Chrome - Molybdenum and Chrome-Molybdenum-Copper Alloys (Ueber Chrom-Molybdän- und Chrom-Molybdän-Kupfer-Legierungen), E. Siedschlag. Zeit. für anorganische u. allgemeine Chemie, vol. 131, no. 2, Oct. 1923, pp. 191–202, 3 figs. Results of investigations.

Ferroalloys. See FERROALLOYS.

Solid Solutions. The Modern Concept of Solid Solutions, Zay Jefferies and R. S. Archer. Chem. & Met. Eng., vol. 29, nos. 21 and 22, Nov. 19 and 26, 1923, pp. 923–926 and 966–969, 4 figs. How they are visualized by metallurgist; presentation of working information regarding constitution and properties of alloys.

ALUMINUM ALLOYS

Constitution and Age Hardening. The Constitution and Age-Hardening of the Quaternary Alloys of Aluminium, Copper, Magnesium, and Magnesium Silicide, Marie L. V. Gayler. Inst. Metals—advance paper, no. 6, for meeting Sept. 10–13, 1923, 28 pp., 22 figs. Constitution of ternary alloys at 400 deg. cent., and of quaternary alloys of aluminum with magnesium silicide and copper and magnesium in definite ratio; age hardening of quaternary alloys.

Ship Castings. Aluminum and Aluminum Alloys for Use on Board Ship, E. M. Hewlett and D. Basch. Am. Soc. Naval Engrs.—Jl., vol. 35, no. 4, Nov. 1923, pp. 675–692, 4 figs. on supp. plates. Discusses casting alloys.

Transformations and Thermal Treatment. A Dilatometric Study of the Transformations and Thermal Treatment of Light Alloys of Aluminium, A. M. Portevin and Pierre Chevenard. Inst. Metals—advance paper, no. 12, for meeting Sept. 10–13, 1923, 19 pp., 12 figs. Application of dilatometric methods, judiciously using recording differential dilatometer, permits of study of transformations and mechanism of heat treatment of light alloys of aluminum-magnesium-silicon, and, in general, of alloys containing two-phase, univarient transformations, a study which had not been carried out up to present.

ALUMINUM BRONZE

Properties and Uses. Aluminium-Bronze. Metal Industry (Lond.), vol. 23, no. 23, Dec. 7, 1923, pp. 505–508, 3 figs. Surveys essential features in general constitution and properties and deals with practical problems in founding and working of principal alloys of series; industrial uses.

Special. Special Aluminum Bronzes (Les bronzes d'aluminium spéciaux), Léon Guillet. Revue de Métallurgie, vol. 20, nos. 2 and 4, Feb. and Apr. 1923, pp. 130–138 and 257–261, 27 figs. Microscopic study; mechanical properties; critical points; heat treatment; variation of mechanical properties as a function of temperature; determination of resistance, density, elongation and other physical properties. Feb.: Copper-aluminum-nickel alloys. Apr.: Phosphor-magnesium- and cobalt-aluminum bronzes.

AMMONIA

Specific Heat. Specific Heat of Superheated Ammonia Vapor, N. S. Osborne, H. F. Stimson, T. S. Slight, Jr. and C. S. Cragoe. Refrig. Eng., vol. 10, no. 5, Nov. 1923, pp. 145–168, 18 figs. Series of measurements which is one of group of experimental investigations of thermodynamic behavior of superheated ammonia vapor; aim has been to obtain calorimetric data for superheated vapor comparable in accuracy with results of other experimental measurements of group, so that consistent tables might be formulated which would agree throughout with experimental data.

APPRENTICES, TRAINING OF

Building Trades, Boston. Apprenticeship in the Building Trades of Boston, Wm. S. Parker, Geo. Thornton, Heywood S. French and Jas. M. Gauld. Boston Soc. Civ. Engrs.—Jl., vol. 10, no. 9, Nov. 1923, pp. 381–403 and (discussion) 403–410. Subject is discussed from viewpoint of architect, contractor and labor group.

AUTOMOBILE ENGINES

Carburetors. See CARBURETORS.

Torsional Oscillations in. Torsional Oscillations in Automotive Engines and Their Experimental Investigation (Drehschwingungen bei Fahrzeugmotoren und deren experimentelle Untersuchung), J. Geiger. Zeit. des Vereines deutscher Ingenieure, vol. 67, no. 47–48, Nov. 24, 1923, pp. 1077–1078, 14 figs. Rotational oscillations as causes of fracture in crankshafts; report on mechanical recording of extremely rapid oscillations up to 60,000 per min.; pressure fluctuations in mixture inlet as cause of slow torsional fluctuations of shaft.

AUTOMOBILE FUELS

Benzol. An Australian Motor Spirit. Indus. Australian & Min. Standard, vol. 70, no. 1821, Oct. 25, 1923, pp. 628–629, 3 figs. Fully-equipped plant for recovery of benzol has been installed at Newcastle works of Broken Hill Proprietary Co. as an adjunct to coke-oven plant and company is now in position to place on Australian market 1,250,000 gal. annually.

Benzol vs. Gasoline. Gasoline or Benzol (Benzin oder Benzol), H. Typke. Wirtschaftsmotor, vol. 5, no. 7, July 25, 1923, pp. 12–13. Discusses standpoints for judgment of what may be termed high-grade fuel: volumetric unit; maximum output; efficiency, and price; judged by these factors, author concludes that superiority of benzol for German conditions is established.

Gasoline. See GASOLINE.

Latent Heat. Equilibrium Boiling-point and Latent Heat of Vaporisation of Motor Fuels, W. R. Ormandy and E. C. Craven. Instn. Petroleum Technologists—Jl., vol. 9, no. 39, Oct. 1923, pp. 368–379, 1 fig. Results of investigations; calculations of latent heats for various mixtures.

Miles per Gallon, Increasing. What the Automotive and Oil Industries Can Do for Each Other, H. L. Horning. Am. Petroleum Inst.—advance paper, for meeting Dec. 11–13, 1923, 14 pp. Points out that it is possible to double miles per gallon of gasoline and lubricating oil on cars, trucks, and in general, by small cost in design.

Mixed. The National Motor Fuel: Study of the Possible Constitution (Le carburant national: Etude sur sa constitution possible), C. Legrand. Chimie & Industrie, vol. 10, no. 3, Sept. 1923, pp. 411–428, 12 figs. Study of an extensive series of binary, ternary and quaternary mixtures of alcohol, benzol, gasoline and ether, with reference to their stability and satisfactory functioning as internal-combustion engine fuels.

Volatility. Economic Motor-Fuel Volatility, S. W. Sparrow. Am. Petroleum Inst.—advance paper, for meeting Dec. 11–13, 1923, 16 pp. Deals with fuel investigation being conducted by Bur. of Standards in coöperation with Soc. Automotive Engrs., Nat. Automobile Chamber of Commerce, and Am. Petroleum Inst.; results obtained since Dec. 1922.

AUTOMOBILE MANUFACTURING PLANTS

American. What About Automobile Shops? A. L. DeLeeuw and K. H. Condit. Am. Mach., vol. 59, nos. 18, 19, 20 and 21, Nov. 1, 8, 15 and 22, 1923, pp. 643–645, 683–684, 723–724 and 753–754. Present conditions in American industry. Nov. 8: Drilling operations. Nov. 15: Lack of uniformity in shop practice. Nov. 22: Present and future development of new machines.

Machine Tools for. Equipping an Ideal Automobile Plant, A. L. DeLeeuw. Am. Mach., vol. 59, no. 23, Dec. 6, 1923, pp. 825–827. Author suggests types of machine tools new to automobile industry, such as magazine feeds, combination machines with rotating tables, non-adjustable standard-type machines and standard unit combinations.

AUTOMOBILES

American Improvements. American-Built Products Predominate at Automobile Salon. Automotive Industries, vol. 49, no. 20, Nov. 15, 1923, pp. 1004–1006, 6 figs. American exhibits at automobile salon in New York. Special bodies with dummy radiator shown on Franklin chassis; Minerva adds front-wheel brakes.

Bodies. Coachwork at the Show. Autocar, vol. 51, no. 1464, Nov. 9, 1923, pp. 963–973, 43 figs. Brief descriptions of bodies of exhibits at Olympia (Lond.) annual automobile exhibition, Nov. 2–10, 1923, arranged in alphabetical order. See also Auto-Motor Jl., vol. 28, no. 45, Nov. 8, 1923, pp. 990–991, 5 figs.

Brakes. Bureau of Standards Makes Definite Checks on Brake Performance, Herbert Chase. Automotive Industries, vol. 49, no. 22, Nov. 29, 1923, pp. 1092–1096, 8 figs. Relative effectiveness of various arrangements and operating means are graphically recorded; use of front-wheel type does not double rate of deceleration, surprising values for friction coefficient between tire and road obtained.

Four-Wheel Brake Adoptions Generate Sharp Discussion in England, M. W. Bourdon. Automotive Industries, vol. 49, no. 21, Nov. 22, 1923, pp. 1051–1057, 16 figs. Perrot type, with modifications, more widely used by British makers; other technical trends shown at Olympia Show.

Four-Wheel Brakes. Autocar, vol. 51, no. 1466, Nov. 23, 1923, pp. 1061–1065, 14 figs. Surveys methods of application and operation.

British Show. A Detailed Consideration of the More Interesting Exhibits of Olympia Show. Automobile Engr., vol. 13, no. 183, Nov. 22, 1923, pp. 354–384, 127 figs. Detailed consideration of more interesting exhibits, including lighting and starting equipment, frames, clutches and clutch couplings, gear boxes, rear axles, springs and suspension, front axles, steering, and front wheel brakes.

The Motor Exhibition at Olympia. Engineering, vol. 116, nos. 3018, 3019 and 3020, Nov. 2, 9 and 16, 1923, pp. 567–568, 584–589 and 613–619, 72 figs. partly on supp. plates. Review of exhibits. See also Engineer, vol. 116, nos. 3540, 3541 and 3542, Nov. 2, 9 and 16, 1923, pp. 469–471, 496–500 and 506, and 528–529, 28 figs.

Daimler and B. S. A. New Daimler and B. S. A. Range. Autocar, vol. 51, no. 1463, Nov. 2, 1923, pp. 821–823, 6 figs. Inclusion of a fast 35-hp. car with 4-wheel brakes and a wide selection of silent-running open and closed carriages.

Elgin. New Elgin Has Automatic Gear Shaft and Four-wheel Brakes. Automotive Industries, vol. 49, no. 22, Nov. 29, 1923, pp. 1106–1107, 5 figs. Standard equipment includes semi-balloon tires and air cleaner; only open model is specially equipped sport car; all body types are mounted on chassis of 118-in. wheelbase; power plant is Falls 6-cylinder, valve-in-head engine.

Essex. Six-Cylinder Essex Car is Announced by Hudson. Automotive Industries, vol. 49, no. 24, Dec. 13, 1923, pp. 1191–1193, 6 figs. New power plant is L-head type, with bore and stroke of 2⅛ by 4 in., providing piston displacement of 130 cu. in.; special body mounting and arrangement of spring suspension give low center of gravity.

European. Cars at Foreign Automotive Association Show Combine Utility and Luxury. Automotive Industries, vol. 49, no. 20, Nov. 15, 1923, pp. 997–1003, 21 figs. Tendency away from bonnets which are wider at cowl than at radiator; further attempts made to give lower bodies; arm rests, dividing rear seats, popular; chassis changes. Foreign exhibits shown at importers' salons in New York.

Farman. The 37.2 Hp. Farman Car. Auto-Motor Jl., vol. 28, no. 47, Nov. 22, 1923, pp. 1025–1028, 7 figs. Six-cylinder monobloc-cast engine; overhead valves, operated by overhead camshaft, latter driven by vertical shaft in vertical housing in front of engine; front-wheel brakes.

German. The Small Grade Automobile (Der Kleine Grade-Wagen), Paul Kahn. Motorwagen, vol. 26, no. 29–30, Oct. 20–31, 1923, pp. 433–435, 3 figs. Equipped with air-cooled two-cycle, two-cylinder, 16-hp. engine.

German Show. Automobiles at the German Automobile Show (Die Kraftwagen auf der Deutschen Automobil-Ausstellung), R. C. V. Gorrissen. Allgemeine Automobil-Zeitung, vol. 24, nos. 39, 40, 41, 42–43 and 44, Oct. 2, 6, 11, 28 and Nov. 6, 1923, pp. 27–30, 26–28, 18–22, 18–19 and 17–18, 4 figs. Details of exhibits.

The German Automobile Show 1923 (Vorschau der Deutschen Automobil-Ausstellung 1923), Rich. Hofmann. Automobil-Rundschau, vol. 22, no. 9, Sept. 1923, pp. 93–100, 12 figs. Details of exhibits of automobiles, motor trucks, motorcycles, engines and parts.

Guy. The New 2-Litre Guy. Autocar, vol. 51, no. 1463, Nov. 2, 1923, p. 825, 2 figs. Data on 1924 model which embodies 4-door bodies, 4-speed gear box, 4-wheel brakes and a 4-cylinder engine.

Lighting and Starting Systems. Electric Lighting and Starting Systems. Autocar, vol. 51, no. 1464, Nov. 9, 1923, pp. 987–991, 12 figs. Descriptions of exhibits at Olympia (Lond.) annual automobile exhibition, Nov. 2–10, 1923.

Locomobile. Oil Lubricated Floating Cam Features Locomobile Front Wheel Brake, Herbert Chase. Automotive Industries, vol. 49, no. 20, Nov. 15, 1923, pp. 994–995, 3 figs. Forward pair is equalized and no unlocking occurs in rounding curves; design similar to Isotta type in most respects.

London Show. The Automobile Show. Autocar, vol. 51, no. 1464, Nov. 9, 1923, pp. 903–963, 244 figs. Brief descriptions of car and chassis exhibits at Olympia (Lond.) annual exhibition, Nov. 1–10, 1923, arranged in alphabetical order. See also Auto-Motor Jl., vol. 28, no. 45, Nov. 8, 1923, pp. 965–987, 93 figs.

See also British Show.

Packard. The Packard Single-Eight, J. G. Vincent and W. R. Griswold. Soc. Automotive Engrs.—Jl., vol. 13, no. 6, Dec. 1923, pp. 485–489 and (discussion)

Manufactured by Advertisers — CLASSIFIED LIST OF MECHANICAL EQUIPMENT — Alphabetical List on page 140

Lidgerwood Mfg. Co.
Link-Belt Co.

Buckets, Self-Dumping
* Brown Hoisting Machinery Co.
Clyde Iron Works Sales Co.
Link-Belt Co.

Burners, Oil
* Combustion Engineering Corp'n
* Schutte & Koerting Co.
* Spray Engineering Co.

Burners, Powdered Fuel
Grindle Fuel Equipment Co.
* Quigley Furnace Specialties Co.

Bushings, Bronze
* Wood's, T. B. Sons Co.

Cabinets and Tables, Blue Print Filing
Dietzgen, Eugene Co.
Economy Drawing Table & Mfg. Co.
Keuffel & Esser Co.
Manufacturing Equip. & Engrg. Co.
ParVell Laboratories
Weber, F. Co. (Inc.)

Cableways, Excavating
Lidgerwood Mfg. Co.

Cableways, Hoisting and Conveying
Lidgerwood Mfg. Co.

Calorimeters
* American Schaeffer & Budenberg Corp'n
* Sarco Co. (Inc.)

Calorizing
Calorizing Co.

Cars, Charging
Easton Car & Construction Co.
* Whiting Corp'n

Cars, Industrial Railway
Easton Car & Construction Co.
Link-Belt Co.
* Whiting Corp'n

Cars, Trolley (Industrial Railway)
Link-Belt Co.

Casehardening
* American Metal Treatment Co.

Casings, Steel (Boiler)
* Brownell Co.
* Casey-Hedges Co.
* Vogt, Henry Machine Co.
* Walsh & Weidner Boiler Co.

Castings, Acid Resistant
* U. S. Cast Iron Pipe & Fdry. Co.

Castings, Aluminum
Buffalo Bronze Die Casting Corp'n
DuPont Engineering Co.

Castings, Brass
* Croll-Reynolds Engineering Co.
Du Pont Engineering Co.
* Edward Valve & Mfg. Co.

Castings, Bronze
Buffalo Bronze Die Casting Corp'n

Castings, Die-Molded
* Doehler Die-Casting Co.
Veeder Mfg. Co.

Castings, Heavy
Farrel Foundry & Machine Co.
* U. S. Cast Iron Pipe & Fdry. Co.

Castings, Iron
* Brown, A. & F. Co.
* Builders Iron Foundry
* Burhorn, Edwin Co.
* Casey-Hedges Co.
* Central Foundry Co.
Chain Belt Co.
* Cole, R. D. Mfg. Co.
* Croll-Reynolds Engineering Co.
DuPont Engineering Co.
* Falls Clutch & Machinery Co.
Farrel Foundry & Machine Co.
* Franklin Machine Co.
* Fuller-Lehigh Co.
* Harrisburg Fdry. & Mach. Wks.
* Jones, W. A. Fdry. & Mach. Co.
Lidgerwood Mfg. Co.
Link-Belt Co.
* Nordberg Mfg. Co.
* Pittsburgh Valve, Fdry. & Const. Co.
* Royersford Fdry. & Mach. Co.
Treadwell Engineering Co.
* U. S. Cast Iron Pipe & Fdry. Co.
* Vogt, Henry Machine Co.

Castings, Monel Metal
Driver-Harris Co., (In Canada)
* Edward Valve & Mfg. Co.

Castings, Nichrome
Driver-Harris Co.

Castings, Nickle Chromium
Driver-Harris Co.

Castings, Semi-Steel
* Builders Iron Foundry
Chain Belt Co.
* Croll-Reynolds Engrg. Co. (Inc.)
Farrel Foundry & Machine Co.
Link-Belt Co.
* Nordberg Mfg. Co.
* Vogt, Henry Machine Co.

Castings, Steel
* Falk Corporation
Link-Belt Co.
Mackintosh-Hemphill Co.
* Reading Steel Casting Co. (Inc.) (Reading Valve & Fittings Div.)
Treadwell Engineering Co.

Castings, White Metal
* Doehler Die-Casting Co.

Cement, Iron and Steel
Smooth-On Mfg. Co.

Cement, Pipe Joint
Smooth-On Mfg. Co.

Cement, Refractory
* Celite Products Co
Johns-Manville (Inc.)
* King Refractories Co. (Inc.)
* Quigley Furnace Specialties Co.

Cement, Water-Resistant
Smooth-On Mfg. Co.

Cement Machinery
* Allis-Chalmers Mfg. Co.
* Fuller-Lehigh Co.
Link-Belt Co.
* Smidth, F. L. & Co.
* Worthington Pump & Machinery Corp'n

Centrifugals, Chemical
Tolhurst Machine Works

Centrifugals, Metal Drying
Tolhurst Machine Works

Centrifugals, Sugar
Fletcher Works
Tolhurst Machine Works
* Worthington Pump & Mchry. Corp'n

Chain Belts and Links
Chain Belt Co.
* Diamond Chain & Mfg. Co.
* Gifford-Wood Co.
* Jones, W. A. Fdry. & Mach. Co.
Link-Belt Co.
Union Chain & Mfg. Co.
* Whitney Mfg. Co.

Chains, Block
Reading Chain & Block Corp'n

Chains, Crane
Reading Chain & Block Corp'n

Chains, Power Transmission
Baldwin Chain & Mfg. Co
Chain Belt Co.
* Diamond Chain & Mfg. Co.
Link-Belt Co.
* Morse Chain Co.
Union Chain & Mfg. Co.
* Whitney Mfg. Co.

Charging Machines
* Whiting Corp'n

Chimneys, Brick (Radial)
Heine Chimney Co.
Morrison Boile Co.

Chimneys, Concrete
Heine Chimney Co.

Chucking Machines
* Jones & Lamson Machine Co
* Warner & Swasey Co.

Chucks, Drill
* S K F Industries (Inc.)
* Whitney Mfg. Co.

Chucks, Tapping
* Whitney Mfg. Co.

Chutes
Chain Belt Co.
* Gifford-Wood Co.
* Hendrick Mfg. Co.
Link-Belt Co.

Cigar Making Machinery
* American Machine & Foundry Co.

Cigarette Making Machinery
* American Machine & Foundry Co.

Circuit Breakers
* General Electric Co.

Circulators, Feed Water
* Schutte & Koerting Co.

Circulators, Steam Heating
* Schutte & Koerting Co.

Cloth, Rubber
* Goodrich, B. F. Rubber Co.

Cloth, Tracing
Dietzgen, Eugene Co.
Keuffel & Esser Co.
ParVell Laboratories
Weber, F. Co. (Inc.)

Clutches, Friction
* Allis-Chalmers Mfg. Co.
* Brown A. & F. Co.
* Falls Clutch & Machinery Co.
Farrel Foundry & Machine Co.
Fletcher Works
* Gifford-Wood Co.
Johnson, Carlyle Machine Co.
* Jones, W. A. Fdry. & Mach. Co.
Link-Belt Co.
* Medart Co.
Philadelphia Gear Works
* Western Engineering & Mfg. Co.
* Wood's, T. B. Sons Co.

Coal
Pennsylvania Coal & Coke Co.

Coal Agitators
Ellis, W. E. Co.

Coal and Ash Handling Machinery
* Brown Hoisting Machinery Co.
Chain Belt Co.
* Gifford-Wood Co.
Link-Belt Co.

Coal Bins
* Brown Hoisting Machinery Co.
Chain Belt Co.
Link-Belt Co.

Coal Breakers and Cleaners
Pennsylvania Crusher Co.

Coal Mine Equipment and Supplies
* General Electric Co.

Coal Mining Machinery
* General Electric Co.
* Ingersoll-Rand Co.

Coal Preparing Equipment
Grindle Fuel Equipment Co.

Coaling Stations, Locomotive
Chain Belt Co.
* Gifford-Wood Co.
Link-Belt Co.

Coating (Metal Protecting)
* American Machine & Foundry Co.

Cocks, Air and Gage
* American Schaeffer & Budenberg Corp'n
* Ashton Valve Co.
* Crane Co.
* Jenkins Bros.
Lunkenheimer Co.
* Reading Steel Casting Co. (Inc.) (Pratt & Cady Division)
* Vogt, Henry Machine Co.

Cocks, Blow-off
* Crane Co.
Lunkenheimer Co.
* Pittsburgh Valve, Fdry. & Const. Co.
* Reading Steel Casting Co. (Inc.) (Pratt & Cady Division)

Cocks, Three-Way and Four-Way
* American Schaeffer & Budenberg Corp'n
* Crane Co.
* Crosby Steam Gage & Valve Co.
Lunkenheimer Co.
* Pittsburgh Valve, Fdry. & Const. Co.
* Reading Steel Casting Co. (Inc.) (Pratt & Cady Division)

Coils, Pipe
* Superheater Co
* Vilter Mfg. Co.
* Vogt, Henry Machine Co.

Coke
Pennsylvania Coal & Coke Co.

Cold Storage Plants
* De La Vergne Machine Co.

Collars, Shafting
Chain Belt Co.
Link-Belt Co.
* Medart Co.
* Royersford Fdry. & Mach. Co.
* Wood's, T. B. Sons Co.

Coloring (Metal)
* American Metal Treatment Co.

Combustion (CO_2) Recorders
* Sarco Co. (Inc.)
* Tagliabue, C. J. Mfg. Co.
* Uehling Instrument Co.

Compressors, Air
* Allis-Chalmers Mfg. Co.
* General Electric Co.
* Goulds Mfg. Co.
* Ingersoll-Rand Co.
Mackintosh-Hemphill Co.
* Nordberg Mfg. Co.
* Titusville Iron Works Co.
* Wayne Tank & Pump Co.
* Worthington Pump & Machinery Corp'n

Compressors, Air, Centrifugal
* De Laval Steam Turbine Co.
* General Electric Co.

Compressors, Air, Compound
* Ingersoll-Rand Co.
* Nordberg Mfg. Co.
* Worthington Pump & Machinery Corp'n

Compressors, Ammonia
* Frick Co. (Inc.)
* Ingersoll-Rand Co.
* Vilter Mfg. Co.
* Vogt, Henry Machine Co.
* Worthington Pump & Machinery Corp'n

Compressors, Gas
* De Laval Steam Turbine Co.
* General Electric Co.
* Ingersoll-Rand Co.
* Nordberg Mfg. Co.
* Worthington Pump & Machinery Corp'n

Condensers, Ammonia
* De La Vergne Machine Co.
* Frick Co. (Inc.)
* Ingersoll-Rand Co.
* Vilter Mfg. Co.
* Vogt, Henry Machine Co.

Condensers, Barometric
* Allis-Chalmers Mfg. Co.
Buffalo Steam Pump Co.
* Ingersoll-Rand Co.
* U. S. Cast Iron Pipe & Fdry. Co.
* Wheeler, C. H. Mfg. Co.
* Wheeler Condenser & Engrg. Co.
* Worthington Pump & Machinery Corp'n

Condensers, Jet
* Allis-Chalmers Mfg. Co.
Buffalo Steam Pump Co.
Elliott Co.
* Ingersoll-Rand Co.
* Nordberg Mfg. Co.
* Schutte & Koerting Co.
* Wheeler, C. H. Mfg. Co.
* Wheeler Condenser & Engrg. Co.
* Worthington Pump & Machinery Corp'n

Condensers, Surface
* Allis-Chalmers Mfg. Co.
Elliott Co.
* Ingersoll-Rand Co
* Nordberg Mfg. Co.
* Westinghouse Electric & Mfg. Co.
* Wheeler, C. H. Mfg. Co.
* Wheeler Condenser & Engrg. Co.
* Worthington Pump & Machinery Corp'n

Conduits
Johns-Manville (Inc.)

Contact Points (Electric), Silver and Platinum
Wilson, H. A. Co.

Controllers, Automatic, for Temperature or for Pressure
(See Regulators)

Controllers, Electric
* General Electric Co.
* Westinghouse Electric & Mfg. Co.

Controllers, Filter Rate
* Builders Iron Foundry
* Simplex Valve & Meter Co.

Controllers, Liquid Level
* Davis, G. M. Regulator Co.
* General Electric Co.
* Simplex Valve & Meter Co.
* Tagliabue, C. J. Mfg. Co.

Converters, Steel
* Whiting Corporation

Converters, Synchronous
* Allis-Chalmers Mfg. Co.
* General Electric Co.
* Westinghouse Electric & Mfg. Co

Conveying Machinery
* Brown Hoisting Machinery Co.
Chain Belt Co.
* Gifford-Wood Co.
* Jones, W. A. Fdry. & Mach. Co.
Link-Belt Co.

Conveying Systems, Powdered Coal
Grindle Fuel Equipment Co.

Conveyor Systems, Pneumatic
* Allington & Curtis Mfg. Co.
* Sturtevant, B. F. Co.

Conveyors, Belt
* Brown Hoisting Machinery Co.
Chain Belt Co.
* Gifford-Wood Co.
Link-Belt Co.

Conveyors, Bucket, Pan or Apron
* Brown Hoisting Machinery Co.
Chain Belt Co.
* Gifford-Wood Co.
* Jones, W. A. Fdry. & Mach. Co
Link-Belt Co.

*Catalogue data of firms marked * appear in the A.S.M.E. Condensed Catalogues of Mechanical Equipment, 1923-24 Volume*

489–492, 5 figs. Two appendices supplementing article published in Journal, Oct. 1923, giving mathematical analyses.

Paris Show. Automobile and Motorcycle Show at Paris (Le XVIIIe Salon de l'Automobile et du Cycle), G. Delanche. Génie Civil, vol. 83, nos. 16, 17 and 18, Oct. 20, 27 and Nov. 3, 1923, pp. 361–375, 401–409 and 424–439, 105 figs. Description of touring-car exhibits; special systems of transmissions, suspensions and brakes.

Rollin. Small Bore, Long Stroke Engine Feature of New Rollin. Automotive Industries, vol. 49, no. 23, Dec. 6, 1923, pp. 1137–1139, 2 figs. 4-wheel brakes and balloon tires are standard equipment; 4-bearing crankshaft used; pistons and connecting rods made of aluminum alloy; chassis has 112-in. wheelbase.

Spring Action and Vibration. Spring-Movement and Vibration Study of Cars in Action, T. J. Litle, Jr. Soc. Automotive Engrs.—Jl., vol. 13, no. 6, Dec. 1923, pp. 445–449, 5 figs. Describes device that combines recording seismograph and spring-action recorder, which is essential is conducting investigations; methods governing use of device when studying spring action and chassis vibration.

Taxicabs. Paris Taxicabs Use Four-Wheel Brakes Built under Serex License, W. F. Bradley. Automotive Industries, vol. 49, no. 24, Dec. 13, 1923, pp. 1213–1215, 6 figs. Patents include three distinct types; tests carried out at Brooklands track show good performance.

Three-Wheeler. Three Wheels Versus Four, R. M. Sanders. Sci. Am., vol. 129, no. 6, Dec. 1923, pp. 386–387, 8 figs. Points out advantages of three-wheeler, as manufactured in Europe, over its predecessor, the motorcycle-and-sidecar combination; direction in which development of economy car is pointed.

Valve-Tappet Parts, Machining. Manufacturing Automobile Valve Tappet Parts. Machy. (N. Y.), vol. 30, no. 4, Dec. 1923, pp. 282–286, 15 figs. Intensive methods employed at plant of Hudson Motor Car Co. in attaining high production rates with standard machine tools.

Wheel Alignment. Motor-Vehicle Wheel-Alignment, J. F. Duby. Soc. Automotive Engrs.—Jl., vol. 13, no. 6, Dec. 1923, pp. 453–458 and (discussion) 458–460, 4 figs. Explains method for obtaining correct alignment that will insure easy steering and cause least amount of tire wear; front-wheel and rear-wheel alignment requirements; analysis of "toe-in" and "camber" and manner of determining them; axle tilt and wheel wabble.

AVIATION

Developments, United States. Comments on Aviation—Naval and Commercial, E. S. Land. Soc. Nav. Architects & Mar. Engrs.—advance paper, no. 2, for meeting Nov. 7–8, 1923, 7 pp. Review of developments in United States during year.

Engineering Work, Employment in. The Aeroplane in Engineering, L. D. Huntoon. Min. & Metallurgy, vol. 4, no. 204, Dec. 1923, pp. 607–611, 3 figs. Air mapping for geological reconnaissance; air reconnaissance for railroads; air-location of metallurgical works; accuracy of aerial traverse tested; applications to forestry; air transportation.

B

BALANCING MACHINES

Eötvos Torsion. The Eötvos Torsion Balance and Its Application to the Finding of Mineral Deposits, Stephen Rybár. Economic Geology, vol. 18, no. 7, Oct.-Nov. 1923, pp. 639–662, 15 figs. Discusses method developed by Eötvos by means of potential theory; describes variometer and its application to determination of subterranean disturbances. Bibliography on publications of Eötvos on subject.

BEARING METALS

Nickel in, Effect of. The Effect of Small Quantities of Nickel upon High-Grade Bearing Metal, A. H. Mundey and C. C. Bissett. Inst. Metals—advance paper, no. 9, for meeting Sept. 10–13, 1923, 5 pp., 5 figs. Result of practical investigation into mechanical and wearing properties of bearing metal of well-known grade, after addition of small but increasing amounts of nickel.

BEARINGS, ROLLER

Bridge. Recommendation for a Standard Bridge Bearing (Vorschlag für ein einheitliches Brückenlager), J. Karig. Bautechnik, vol. 1, nos. 38, 40–41 and 43, Sept. 7, 21 and Oct. 5, 1923, pp. 357–360, 416–420 and 429–433, 32 figs. Based on years of experience author makes recommendation for an economical roller bearing; discusses basic form of bearing; permissible stresses; bearing pressures; calculation of rollers; roller base and cover plate, head plate; recommendation for sizes of bearings; special forms; calculation.

BLAST-FURNACE GAS

Purification by Electric Filter. The Electric Filter Experimental Station for the Purification of Blast-Furnace Gas at the Rhenish Steel Works in Duisburg-Meiderich (Die Elektrofilter-Versuchsanlage zur Reinigung von Hochofengas auf den Rheinischen Stahlwerken in Duisburg-Meiderich), H. Lent. Stahl u. Eisen, vol. 43, no. 48, Nov. 29, 1923, pp. 1467–1471 and (discussion) 1471–1474, 4 figs. Fundamentals of electric gas purification; review of literature; tests of Siemens-Schuckert Works; difficulties with hot gas; results of tests at experimental stations of Rhenish Steel Works; conclusions.

BOILER FEEDWATER

Deaerating. Lowering Oxygen in Water Reduces Corrosion, Chas. E. Colborn. Power Plant Eng., vol. 27, no. 24, Dec. 15, 1923, pp. 1225–1226, 1 fig. Laws governing amount of gas water will dissolve and means of deaerating water.

Feed Meters. The Testing of Boiler-Feed Meters. Power Engr., vol. 18, no. 213, Dec. 1923, pp. 457–459, 5 figs. General methods adopted by Glenfield & Kennedy.

Treatment. Cost Analysis of Feed Water Softening, Allen F. Brewer. Elec. Light & Power, vol. 1, no. 11, Nov. 1923, pp. 17–19 and 75–77, 10 figs. Water-softening methods; discusses items of expense in plant operation which would be affected by installation of feedwater purifying system; other determining factors.

Internal Treatment of Boiler Water—Proper and Improper, D. K. French. Indus. & Eng. Chem., vol. 15, no. 12, Dec. 1923, pp. 1239–1243, Study of internal treatment applied directly in boiler for correction of difficulties encountered in steam production; reactions in boiler; principles on which treatments act; discusses proprietary compounds which have done so much to discredit this method of treatment.

BOILER FURNACES

Air-Supply Regulation. The Expediency of Regulated Air Supply for Fuel Economy (Nutzen geregelter Verbrennungsluftzufuhr für sparsame Brennstoffwirtschaft), H. Schwarz. Archiv für Wärmewirtschaft, vol. 4, no. 9, Sept. 1923, pp. 172–173, 1 fig. Describes automatic apparatus for regulating air supply for combustion.

Combustion Systems. Factors in the Choice of a Combustion System, E. B. Ricketts. Power Plant Eng., vol. 27, no. 23, Dec. 1, 1923, pp. 1194–1196. Points out that future selection of firing methods will lie between stoker, pulverized fuel and low-temperature coal distillation.

Low-Grade Anthracite. Investigations of Furnaces with Special Regard to Low-Grade Anthracite (Feuerungsuntersuchungen mit besonderer Berücksichtigung minderwertiger Steinkohle), H. Ebel. Wärme, vol. 46, nos. 40, 41, 42 and 43, Oct. 5, 12, 19 and 26, 1923, pp. 439–442, 451–454, 462–465 and 472–474, 15 figs. Sources of losses with low-grade anthracite; principles of combustion; hydrogen losses; apparent and actual excess of air; heat generated per cu. m. flue gas; producable heat, carbon losses, quality and calorific efficiency of furnaces; heat balances, flue-gas volume and chimney losses.

BOILER HOUSES

Efficiency. The Importance of the Boiler House, David Brownlie. Eng. & Boiler House Rev., vol. 37, no. 4, Oct.-Nov. 1923, pp. 93–94. Discusses present inefficiency due to design and equipment of plant and methods of controlling working of plant, and gives suggestions for improvements.

BOILER OPERATION

Flue Cleaning. Boiler Flue Cleaning by Suction. Eng. & Boiler House Rev., vol. 37, no. 4, Oct.-Nov. 1923, pp. 111–112, 1 fig. Brief description of plant designed by British Vacuum Cleaner & Eng. Co., Ltd.; illustrates one method of application.

BOILER ROOMS

Losses in, Prevention of. The Prevention of Boiler Room Losses, Jas. T. Beard, 2nd. Indus. Management (N. Y.), vol. 66, no. 6, Dec. 1923, pp. 355–360, 5 figs. Discusses causes of losses and methods of prevention.

BOILERS

Coal Mines. Advance in Steam-Boiler Practice in Anthracite Region, M. M. Rice. Coal Age, vol. 24, no. 21, Nov. 22, 1923, pp. 767–772, 4 figs. Importance of burning small sizes of coal at mines; changes in boiler and furnace design to obtain efficient combustion; benefits of high stacks.

Corrosion. Boiler Corrosion, W. S. Patterson. Inst. Mar. Engrs.—Trans., Nov. 1923, pp. 348–366, 6 figs. Collation of information, discussing and focusing causes, and suggesting methods of combating corrosion in marine boilers.

Fireholes. Notes on the Design of Fireholes of Steam Boilers, A. Wrench. Ry. Gaz., vol. 39, no. 20, Nov. 16, 1923, p. 620, 9 figs. Comments on various methods of construction, their respective advantages and drawbacks.

Gas Passages, Chart for. Chart for the Design of Gas Passages, M. E. Yeager. Power Plant Eng., vol. 27, no. 24, Dec. 15, 1923, pp. 1226–1228, 1 fig. Explanation of chart for reading areas of gas passages in boilers and furnaces.

Hydrostatic Test. What is the Value of the Hydrostatic Test? Thos. H. Fenner. Power, vol. 58, no. 22, Nov. 27, 1923, pp. 851–853. Shows where hydrostatic test can be of great assistance in determining condition of object under examination, and also other cases where it may be detriment to safety which it seeks to insure.

Loading. The Economical Limits of Boiler Loading, Chas. P. Wade. Elec. Rev., vol. 93, no. 2398, Nov. 9, 1923, pp. 687–688. Discusses factors determining upper limits of economical loading of any given plant, namely, available draft power, draft system, labor costs, class and quality of fuel used.

Locomotive. See LOCOMOTIVE BOILERS.

Waste-Heat. The Clarkson Waste Heat Boiler. Engineering, vol. 116, no. 3023, Dec. 7, 1923, pp. 711–713, 7 figs. Can be used to provide abundant supply of hot water, or alternately a useful supply of steam, according to manner in which it is operated; with aid of Clarkson boiler, nearly 60 per cent of waste of engine was recovered.

Water-Tube. See BOILERS, WATER-TUBE.

BOILERS, WATER-TUBE

Babcock & Wilcox Plant, Australia. Manufacture of Boilers, Conveyors, Cranes, Etc. Indus. Australian & Min. Standard, vol. 70, no. 1822, Nov. 1, 1923, pp. 666–668, 7 figs. Historical development of water-tube boiler, and relative merits of this type of boiler; description of new works of Babcock & Wilcox, Ltd. at Regent's Park, Sydney, Australia.

Deformations. Deformations in Vertical-Tube Boilers While Heating (Formänderungen von Steilrohrkesseln beim Ahheizen), Wilhelm Otte. Zeit. des Vereines deutscher Ingenieure, vol. 67, no. 44, Nov. 3, 1923, pp. 1021–1023, 12 figs. General discussion; results of measurements and conclusions.

Spearing. The Spearing Boiler. Eng. & Boiler House Rev., vol. 37, no. 4, Oct.-Nov. 1923, pp. 99–100, 3 figs. Principal features of Spearing water-tube boiler.

Tubes, External Cleaning. External Cleaning of Water Tube Boiler Tubes. Engr. & Boiler House Rev., vol. 37, no. 4, Oct.-Nov. 1923, pp. 105–106, 2 figs. Economy to be effected by regular soot removal from boiler tubes; soot-removing apparatus.

Water-Circulation and Efficiency Tests. Water Circulation and Increasing Efficiency of Water-Tube Boilers (Wasserumlauf und Leistungssteigerung der Wasserrohrkessel), H. Maas. Zeit. des Bayerischen Revisions-Vereins, vol. 27, nos. 19 and 20, Oct. 15 and 21, 1923, pp. 145–148 and 156–158, 11 figs. Discusses observations made in operation of highly stressed water-tube boilers and reports on water-surface measurements, water-circulation and efficiency tests on different types of boilers; conclusions and recommendations for design of high-power boilers, based on tests.

Yarrow Land Type. Yarrow Land Type Boilers. Elec. Times, vol. 64, no. 1673, Nov. 8, 1923, pp. 483–484, 2 figs. Application of Yarrow boiler to central station in Newcastle-upon-Tyne.

BORING MACHINES

Multiple-Spindle. Improvements Made in Boring Machine. Automotive Industries, vol. 49, no. 22, Nov. 29, 1923, pp. 1112–1113, 2 figs. Multiple-spindle tool designed for production use; heads are detachable arranged for either belt or motor drive.

BRASS

Corrosion. Corrosion of Brass as Affected by Grain Size, Rob. J. Anderson and Geo. M. Enos. Am. Inst. Min. & Met. Engrs.—Trans., no. 1282-N, Dec. 1923, 11 pp., 6 figs.; also (abstract) in Min. & Metallurgy, vol. 4, no. 204, Dec. 1923, p. 624, 1 fig. Describes series of tests using accelerated electrolytic corrosion test developed by writers in Bur. of Mines; results show that, for brass tested and corrosive solutions used, effect of grain size (from 0.01 to 0.10 mm. diam.) on corrosion loss is very small and probably can be ignored for practical purposes; in general, however, brass with smaller grain size tends to corrode less than that with larger grain size.

BRASS FOUNDRIES

Crucibles. The Care of Brass Foundry Crucibles, C. F. Hopkins. Metal Industry (Lond.), vol. 23, no. 21, Nov. 23, 1923, pp. 459–460, 7 figs. Points out importance of proper annealing, treatment of crucibles in furnace; handling crucibles. (Abstract.) Address before Phila. Foundrymen's Assn.

C

CALORIMETERS

Boys. A General-Purpose Recording Drum, C. V. Boys. Jl. of Sci. Instruments, vol. 1, no. 1, Oct. 1923, pp. 26–28, 3 figs. Describes a convenient auxiliary of recording drum for recording continuously volume of a certain quantity of air at the temperature and pressure at the time and saturated with water vapor; developed in connection with integrating and recording gas calorimeter, but modified to be of general application.

Pressure and Temperature Corrector. A New Automatic Pressure and Temperature Corrector for Gas Volumes, C. H. Beasley. Chem. & Industry, vol. 42, no. 48, Nov. 30, 1923, pp. 457T–459T, 3 figs. Describes improvements made in Beasley recording net value calorimeter and how they were arrived at.

CAMS

Machining. An Ingenious Device for Making a Peculiar Cam, Ellsworth Sheldon. Am. Mach., vol. 59, no. 21, Nov. 22, 1923, pp. 773–775, 3 figs. Describes cams for Rivett grinding machine and device and method of machining them.

CAR LIGHTING

Systems. Principal Systems of Individual Electric Lighting Applied to Railway Cars (Les principaux systèmes d'éclairage électrique individuel appliqusé aux voitures de chemins de fer), M. Bougrier. Electricien, vol. 37, nos. 1287 and 1288, Nov. 1 and 15, 1921, vol. 38, nos. 1304 and 1310, July 15 and Oct. 15, 1922, and vol. 39, no. 1318, Feb. 15, 1923, pp. 481–488, 505–513, 313–320, 457–464, 75–81, 40 figs. Lighting by candles, oil, electricity and acetylene; systems of individual and of collective electric lighting; voltage of lights and regulation of voltage; dynamos and batteries; Stone, Vicarino and other systems; Rosenberg system and its application to French state railways.

CARBURETORS

Design Theory. Explains Theory Governing Carburetor with Intake Throttle, P. S. Tice. Automotive Industries, vol. 49, no. 22, Nov. 29, 1923, pp. 1099–1101, 7 figs. Mixture required to give minimum consumption varies only with inlet pressure due to corresponding dilution of charge with burned products;

Manufactured by Advertisers — CLASSIFIED LIST OF MECHANICAL EQUIPMENT — Alphabetical List on page 110

Conveyors, Chain
* Brown Hoisting Machinery Co.
Chain Belt Co.
Link-Belt Co.

Conveyors, Ice
Chain Belt Co.
* Gifford-Wood Co.
Link-Belt Co.

Conveyors, Portable
* Gifford-Wood Co.
Link-Belt Co.

Conveyors, Screw
Chain Belt Co.
* Gifford-Wood Co.
Link-Belt Co.

Cooling Ponds, Spray
* Cooling Tower Co. (Inc.)
* Schutte & Koerting Co.
* Spray Engineering Co.

Cooling Towers
* Burhorn, Edwin Co.
* Cooling Tower Co. (Inc.)
* Spray Engineering Co.
* Wheeler, C. H. Mfg. Co.
* Worthington Pump & Machinery Corp'n

Copper, Drawn
* Roebling's, John A. Sons Co.

Copper Converting Machinery
* Allis-Chalmers Mfg. Co.
* Worthington Pump & Machinery Corp'n

Counters, Revolution
* American Schaeffer & Budenberg Corp'n
* Ashton Valve Co.
* Bristol Co.
* Crosby Steam Gage & Valve Co.
Veeder Mfg. Co.

Countershafts
* Builders Iron Foundry
* Wood's, T. B. Sons Co.

Couplings, Pipe
Byers, A. M. Company
* Central Foundry Co.
* Crane Co.
Lunkenheimer Co.

Coupling, Shaft (Flexible)
* Allis-Chalmers Mfg. Co.
* Brown, A. & F. Co.
* Falk Corporation
* Fawcus Machine Co.
* Jones, W. A. Fdry. & Mach. Co.
* Medart Co.
* Nordberg Mfg. Co.
* Smith & Serrell

Coupling, Shaft (Rigid)
* Allis-Chalmers Mfg. Co.
* Brown, A. & F. Co.
Chain Belt Co.
Cumberland Steel Co.
* Falls Clutch & Machinery Co.
Farrel Foundry & Machine Co.
* General Electric Co.
* Jones, W. A. Fdry. & Mach. Co.
Link-Belt Co.
* Medart Co.
* Royersford Fdry. & Mach. Co.
* Smith & Serrell
* Wood's, T. B. Sons Co.

Couplings, Universal Joint
* Wood's, T. B Sons Co.

Coverings, Steam Pipe
Carey, Philip Co.
Johns-Manville (Inc.)

Cranes, Electric Traveling
Northern Engineering Works
* Whiting Corporation

Cranes, Floor (Portable)
Lidgerwood Mfg. Co.

Cranes, Gantry
* Brown Hoisting Machinery Co.
Link-Belt Co.
Northern Engineering Works
* Whiting Corp'n

Cranes, Hand Power
* Brown Hoisting Machinery Co.
Clyde Iron Works Sales Co.
Northern Engineering Works
* Whiting Corp'n

Cranes, Jib
* Brown Hoisting Machinery Co.
Northern Engineering Works
* Whiting Corp'n

Cranes, Locomotive
* Brown Hoisting Machinery Co.
Link-Belt Co.
* Whiting Corp'n

Cranes, Locomotive (Crawler)
Link-Belt Co.

Cranes, Pillar
* Brown Hoisting Machinery Co.
Northern Engineering Works
* Whiting Corp'n

Cranes, Portable
* Brown Hoisting Machinery Co.
Clyde Iron Works Sales Co.
Link-Belt Co.

Crucibles, Graphite
Dixon, Joseph Crucible Co.

Crushers, Clinker
Farrel Foundry & Machine Co.

Crushers, Coal
* Allis-Chalmers Mfg. Co.
* Brown Hoisting Machinery Co.
* Fuller-Lehigh Co.
* Gifford-Wood Co.
Link-Belt Co.
Pennsylvania Crusher Co.
* Smidth, F. L. & Co.
* Worthington Pump & Machinery Corp'n

Crushers, Hammer
Pennsylvania Crusher Co.

Crushers, Jaw
Farrel Foundry & Machine Co.
* Worthington Pump & Machinery Corp'n

Crushers, Ore and Rock
Farrel Foundry & Machine Co.
* Nordberg Mfg. Co.
Pennsylvania Crusher Co.

Crushers, Roll
Link-Belt Co.
Pennsylvania Crusher Co.
* Worthington Pump & Machinery Corp'n

Crushing and Grinding Machinery
* Allis-Chalmers Mfg. Co.
Farrel Foundry & Machine Co.
* Fuller-Lehigh Co.
Pennsylvania Crusher Co.
* Smidth, F. L. & Co.
* Worthington Pump & Machinery Corpn'

Cupolas
* Bigelow Co.
Northern Engineering Works
* Whiting Corp'n

Cutters, Bolt
* Landis Machine Co. (Inc.)

Cutters, Milling
* Whitney Mfg. Co.

Dehumidifying Apparatus
* American Blower Co.
* Carrier Engineering Corp'n

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Clyde Iron Works Sales Co.
Lidgerwood Mfg. Co.

Diaphragms, Rubber
* United States Rubber Co.

Die Castings
(See Castings, Die Molded)

Die Heads, Thread Cutting (Self-opening)
* Jones & Lamson Machine Co.
* Landis Machine Co. (Inc.)

Dies, Punching
* Niagara Machine & Tool Works

Dies, Sheet Metal Working
* Niagara Machine & Tool Works

Dies, Stamping
* Niagara Machine & Tool Works

Dies, Thread Cutting
* Curtis & Curtis Co.
* Jones & Lamson Machine Co.
* Landis Machine Co. (Inc.)

Diesel Engines
(See Engines, Oil, Diesel)

Digesters
* Bigelow Co.

Distilling Apparatus
* Vogt, Henry Machine Co.

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Dietzgen, Eugene Co.
Economy Drawing Table & Mfg. Co.
Keuffel & Esser Co.
ParVell Laboratories
Weber, F. Co. (Inc.)

Drawing Instruments and Materials
Dietzgen, Eugene Co.
Keuffel & Esser Co.
ParVell Laboratories
Weber, F. Co. (Inc.)

Dredges, Hydraulic
* Morris Machine Works

Dredging Machinery
Lidgerwood Mfg. Co.
* Morris Machine Works

Dredging Sleeve
* United States Rubber Co.

Drilling Machines, Sensitive
* Royersford Fdry. & Mach. Co.

Drilling Machines, Vertical
* Royersford Fdry. & Mach. Co.

Drills, Coal and Slate
* General Electric Co.
* Ingersoll-Rand Co.

Drills, Core
* Ingersoll-Rand Co.

Drills, Rock
* General Electric Co.
* Ingersoll-Rand Co.

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Johns-Manville (Inc.)
Manufacturing Equip. & Engrg. Co.
Murdock Mfg. & Supply Co.

Dryers, Coal
Grindle Fuel Equipment Co.

Dryers, Rotary
* Bigelow Co.
Farrel Foundry & Machine Co.
* Fuller-Lehigh Co.
Link-Belt Co.
* Sturtevant, B. F. Co.

Drying Apparatus
* American Blower Co.
* Carrier Engineering Corp'n
* Clarage Fan Co.
Philadelphia Drying Mchry. Co.
* Sturtevant, B. F. Co.

Dust Collecting Systems
* Allington & Curtis Mfg. Co.
* Allis-Chalmers Mfg. Co.
* Clarage Fan Co.
* Sturtevant, B. F. Co.

Dust Collectors
* Allington & Curtis Mfg. Co.
* Allis-Chalmers Mfg. Co.
* Sturtevant, B. F. Co.

Dyeing Machinery
Philadelphia Drying Mchry. Co.

Dynamometers
* American Schaeffer & Budenberg Corp'n
* General Electric Co.
* Wheeler, C. H. Mfg. Co.

Economizers, Fuel
* Green Fuel Economizer Co.
* Sturtevant, B. F. Co.

Ejectors
* Schutte & Koerting Co.

Electrical Machinery
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* General Electric Co.
* Westinghouse Electric & Mfg. Co.

Electrical Supplies
* General Electric Co.
Johns-Manville (Inc.)

Elevating and Conveying Machinery
* Brown Hoisting Machinery Co.
Chain Belt Co.
* Gifford-Wood Co.
* Jones, W. A. Fdry. & Mach. Co.
Link-Belt Co.

Elevators, Electric
* American Machine & Foundry Co.
Northern Engineering Works

Elevators, Hydraulic
* Whiting Corp'n

Elevators, Passenger and Freight
Northern Engineering Works

Elevators, Pneumatic
* Whiting Corp'n

Elevators, Portable
* Gifford-Wood Co.
Link-Belt Co.

Elevators, Telescopic
Link-Belt Co

Emery Wheel Dressers
* Builders Iron Foundry

Engine Repairs
* Franklin Machine Co.
* Nordberg Mfg. Co.

Engine Stops
* Schutte & Koerting Co.

Engines, Blowing
* Allis-Chalmers Mfg. Co.
Mackintosh-Hemphill Co.
* Nordberg Mfg. Co.
* Worthington Pump & Machinery Corp'n

Engines, Gas
* Allis-Chalmers Mfg. Co.
* De La Vergne Machine Co.
* Ingersoll-Rand Co.
Otto Engine Works
Sterling Engine Co.
* Titusville Iron Works Co.
* Westinghouse Electric & Mfg. Co.

Engines, Gasoline
Otto Engine Works
Sterling Engine Co.
* Sturtevant, B. F. Co.
* Titusville Iron Works Co.
* Worthington Pump & Machinery Corp'n

Engines, Hoisting
* Allis-Chalmers Mfg. Co.
Clyde Iron Works Sales Co.
Lidgerwood Mfg. Co.
* Morris Machine Works
* Nordberg Mfg. Co.

Engines, Kerosene
* Worthington Pump & Machinery Corp'n

Engines, Marine
* Ingersoll-Rand Co.
Johnson, Carlyle Machine Co.
* Nordberg Mfg. Co.
Sterling Engine Co.
* Sturtevant, B. F. Co.
* Ward, Chas. Engineering Works
* Worthington Pump & Machinery Corp'n

Engines, Marine, Oil
* Ingersoll-Rand Co.
* Nordberg Mfg. Co.

Engines, Marine, Steam
* Nordberg Mfg. Co.

Engines, Oil
* Allis-Chalmers Mfg. Co.
* De La Vergne Machine Co.
* Ingersoll-Rand Co.
* Nordberg Mfg. Co.
Otto Engine Works
* Titusville Iron Works Co.
* Worthington Pump & Machinery Corp'n

Engines, Oil, Diesel
* Allis-Chalmers Mfg. Co.
* Nordberg Mfg. Co.
* Worthington Pump & Machinery Corp'n

Engines, Pumping
* Allis-Chalmers Mfg. Co.
* Ingersoll-Rand Co.
* Morris Machine Works
* Nordberg Mfg. Co.
Sterling Engine Co.
* Worthington Pump & Machinery Corp'n

Engines, Steam
* Allis-Chalmers Mfg. Co.
* American Blower Co.
* Brownell Co.
* Clarage Fan Co.
Clyde Iron Works Sales Co.
* Cole, R. D. Mfg. Co.
* Engberg's Electric & Mech. Wks.
* Erie City Iron Works
* Harrisburg Fdry. & Mach. Wks.
* Ingersoll-Rand Co.
* Leffel, James & Co.
Lidgerwood Mfg. Co.
Mackintosh-Hemphill Co.
* Morris Machine Works
* Nordberg Mfg. Co.
Ridgway Dynamo & Engine Co.
* Sturtevant, B. F. Co.
* Titusville Iron Works Co.
* Troy Engine & Machine Co.
* Vilter Mfg. Co.
* Westinghouse Electric & Mfg. Co.
* Wheeler, C. H. Mfg. Co.

Engines, Steam, Automatic
* American Blower Co.
* Brownell Co.
* Clarage Fan Co.
* Engberg's Electric & Mech. Wks.
* Erie City Iron Works
* Harrisburg Fdry. & Mach. Wks.
* Leffel, James & Co.
* Sturtevant, B. F. Co.
* Troy Engine & Machine Co.
* Westinghouse Electric & Mfg. Co.

Engines, Steam, Corliss
* Allis-Chalmers Mfg. Co.
* Franklin Machine Co.
* Frick Co. (Inc.)
* Harrisburg Fdry. & Mach. Wks.
Mackintosh-Hemphill Co.
* Nordberg Mfg. Co.
* Vilter Mfg. Co.

Engine, Steam, High Speed
* American Blower Co.
* Brownell Co.

*Catalogue data of firms marked * appear in the A.S.M.E. Condensed Catalogues of Mechanical Equipment, 1923-24 Volume*

design of Stewart-Warner instrument is based on this fact, not on proportioning fuel to air drawn through.

Heavy-Oil. Heavy Oil Carburetors at the Berlin Automobile Show (Schwerölbetrieb auf der Berliner Autoausstellung). Allgemeine Automobil-Zeitung, vol. 24, no. 40, Oct. 6, 1923, pp. 29–32, 7 figs. Details of engines and carburetors for use of heavy oil.

Heavy Oils for Automobile Engines (Schweröle für Automobilmotoren). Automobil-Rundschau, vol. 22, no. 7, July 1923, pp. 66–68, 2 figs. Describes heavy-oil carburetor of the Schiele- & Bruchsaler-Konzern, consisting essentially of two float arrangements with nozzles separated for crude oil and for light oil, and of a vaporizer.

Kiesel. The Kiesel Carburetor and Its Operation (Der Kiesel-Vergaser und seine Wirkungsweise). H. Rolfberg. Motor u. Auto, vol. 20, no. 12, June 25, 1923, 5 figs. Details of carburetor in which all functions are combined in a single organ, and its advantages.

CARS

Draft-Gear Closures. A Mathematical Law of Impact between Cars, E. M. Richards. Ry. Mech. Engr., vol. 97, nos. 11 and 12, Nov. and Dec. 1923, pp. 760–762 and 817–819, 3 figs. Study of time of partial and full-draft gear closures, checked by test results of U. S. R. R. Administration.

CARS, PASSENGER

Building Methods. Production Methods in British Passenger Car Building, D. R. Lamb. Ry. Rev., vol. 73, no. 22, Dec. 1, 1923, pp. 782–786, 12 figs. Modern production methods in wooden passenger-car building introduced at Derby Works of Lond. Midland & Scottish Ry.; departure in woodworking involves machining to size within extremely close limits.

CAST IRON

Defective, Examination of. The Examination of Defective Ferrous Materials in an Engineering Works, T. Henry Turner. Engineering, vol. 116, no. 3022, Nov. 30, 1923, pp. 698–700, 3 figs. Considers abnormalities which appear from time to time in machine shops of large modern engineering works; deals with cast and wrought materials and methods of overcoming evil effects of defects; laboratory work which discovery of defects entails. Paper read before Birmingham Met. Soc.

Electric-Furnace Production. Grey Cast Iron from the Point of View of the Electric Furnace, G. K. Elliott. Foundry Trade Jl., vol. 28, no. 378, Nov. 15, 1923, pp. 419–420. Main features of acid and basic electric furnaces, and effects of each upon principal elements of cast iron in comparison with effects obtained through cupola; problems of cast iron that have arisen through introduction of electric furnace for treating cast iron. Paper read before Am. Foundrymen's Assn.

Hardening. Hardening Cast Iron by Chilling, F. C. Edwards. Metal Industry (Lond.), vol. 23, no. 21, Nov. 23, 1923, pp. 467–468, 2 figs. Author takes particular problems attached to molding and casting of chilled rolls to illustrate main principles concerned.

High-Grade Low-Carbon. German Views on Semi-Steel and other High-Grade Low-Carbon Cast-Irons. F. Wust and P. Bardenhener. Foundry Trade Jl., vol. 28, no. 378, Nov. 15, 1923, pp. 410–412. Melting in a crucible; mixing of liquid steel and liquid pig iron; melting in an open-hearth furnace; melts made in electric furnace; casts made in cupola. Translated from Die Giesserei.

Pearlitic. Tells of Pearlitic Cast Iron, Carl Sipp. Foundry, vol. 51, no. 24, Dec. 15, 1923, pp. 986–987. Structure of pearlite secured in iron by pouring low-silicon metal into heated molds; claim made for improved physical properties of metal, especially under dynamic tests.

Strength at High Temperatures. The Strength of Cast Iron (Semi-Steel Mixtures) at High Temperatures, Arthur Marks. Foundry Trade Jl., vol. 28, no. 378, Nov. 15, 1923, pp. 421–422, 2 figs. Results of research carried out with a view to investigating cause of failure at high temperatures and upper limiting temperature at which cast iron may be safely used, and to determine temperature at which cast iron mixtures, when heated, showed a rapid drop in strength.

Tests. A Consideration of Some Mechanical Tests on Cast Iron, E. Siegle. Foundry Trade Jl., vol. 28, nos. 379 and 380, Nov. 22 and 29, 1923, pp. 433–436 and 467, 10 figs. Results of shear and transverse tests carried out by author; mechanical properties of hematite and semi-phosphorus irons. Translated from paper presented before Paris Int. Congress.

Tests on Piping and Shrinkage in Cast Iron, O. Bauer and K. Sipp. Foundry Trade Jl., vol. 28, no. 376, Nov. 1, 1923, pp. 376–377, 4 figs. Results of tests carried out to determine effects of silicon, manganese, phosphorus and sulphur on cast iron. Abstract from Stahl u. Eisen.

CASTING

Centrifugal. Casting Iron Centrifugally, J. A. Rathbone. Foundry, vol. 51, no. 24, Dec. 15, 1923, pp. 988–990, 2 figs. Piston-ring castings made centrifugally chilled when cast against metal molds and different types of cores were utilized to prevent this action; annealing experiments. Paper presented at Am. Foundrymen's Assn.

CENTRAL STATIONS

Control and Checking System. Control and Checking Systems for Automatic Stations, R. J. Wensley. Elec. World, vol. 82, no. 21, Nov. 1923, pp. 1062–1064, 5 figs. Apparatus developed for use of system dispatcher in controlling and checking operations in distant automatic generating stations and substations.

Remote Indicator. The Cambridge Remote Indicator. Elec. Rev., vol. 93, no. 2396, Oct. 26, 1923, pp. 608–609, 3 figs. By suitable modifications, voltage, current, power, or power factor can be indicated many miles away, at small cost; system has been in successful operation for five years between two power stations 8 mi. apart. See also Electn., vol. 91, no. 2371, Oct. 26, 1923, pp. 458–459, 6 figs.

Ventilation. Ventilation of Electrical Stations. Contract Rec. & Eng. Rev., vol. 37, no. 47, Nov. 21, 1923, pp. 1104–1106, 3 figs. Difficulties of adequately ventilating some types of substation buildings; apparatus necessary; means of exhausting stale air.

CHARTS

Engineering and Business. Engineering and Business Charts, A. W. Swan. Eng. Production, vol. 6, no. 135, Dec. 1923, pp. 496–500, 12 figs. Classes of chart users; squared paper chart; laying out horizontal and vertical scales; correct use of scales; ratio charts; straight-line chart and its uses; special slide rules and alignment charts.

COAL

B.t.u. Value. Pratical Value of B. Th. U. in Coal, G. A. Rosetti. Practical Engr., vol. 68, no. 1917, Nov. 22, 1923, pp. 289–291. Discusses following point: assuming that facts of test are known and agreed, as to quantity and quality of fuel used, quantity and conditions of evaporation produced, conditions of combustion, etc., what is correct figure for efficiency?

Specific Heat. The Specific Heat of Coal and Its Relation to Composition, G. Coles. Chem. & Industry, vol. 42, no. 46, Nov. 16, 1923, pp. 435T–439T, 4 figs. Determinations of specific heat made by means of Bunsen ice calorimeter; results and conclusions.

COLD STORAGE

Fruits and Vegetables. The Cooling of Fruit and Vegetables in the Cold-Storage Building of Abattoir in Norrköping (Sweden) (Die Kühlung von Obst und Gemüse im Kühlhause des Schlachthofes zu Norrköping). Zeit. für die gesamte Kälte-Industrie, vol. 30, no. 9, Sept. 1923, pp. 101–105, 13 figs. Results of tests carried out in cold-storage building by L. Rasmussen.

COMBUSTION

Volumetric Representation. The Volumetric Representation of Combustion Phenomena (Zur räumlichen Darstellung von Verbrennungsvorgängen), Georg Szende. Feuerungstechnik, vol. 12, nos. 1 and 2, Oct. 1 and 15, 1923, pp. 1–4 and 9–13, 7 figs. Relation between three given components of flue gases is expressed by so-called flue-gas planes, simple construction of which is shown; flue-gas planes of different fuels are shown to bear very simple geometrical relations to one another, and their total forms what is known as flue-gas body, which gives very clear representation of combustion phenomena.

COMPRESSED AIR

Pneumatic Mail Tubes. Continental Pneumatic Postal Tube Installation. Indus. Management (Lond.), vol. 10, no. 10, Nov. 15, 1923, pp. 283–285, 5 figs. Latest developments of pneumatic appliances employed for postal purposes in city of Munich, Germany. Translated from Zeit. des Vereines deutscher Ingenieure.

CONDENSERS, STEAM

Specifications. Condenser Specifications and Bids for Detroit Municipal Plant. Power, vol. 58, no. 24, Dec. 11, 1923, pp. 934–936. Presents initial tabulation of condenser bids, illustrating methods employed.

CONNECTING RODS

Production Methods. Connecting Rod Production Accelerated by Gang System and Good Jigs, W. L. Carver. Automotive Industries, vol. 49, no. 23, Dec. 6, 1923, pp. 1155–1161, 13 figs. Methods in forge and machine shops in production of Jewett connecting rod.

CONVEYORS

Belt. Conveyor Belts Resist Abrasion of Concrete Mixture, F. W. Kennedy. Belting, vol. 23, no. 5, Nov. 1923, pp. 21–24, 9 figs. Accumulation of concrete on belt prevented by rubber scraper and water jets; Laurel Road dam, under construction near New Canaan, Conn., makes unique use of conveyors.

Conveyors. Sci. & Art of Min., vol. 34, no. 7, Oct. 27, 1923, pp. 102–103, 4 figs. Describes band, its advantages and disadvantages; Sutcliffe belt conveyor; suspended through conveyor.

Chain System. Conveyor System in Continuous Motion. Iron Age, vol. 112, no. 24, Dec. 13, 1923, pp. 1594–1595, 4 figs. Handles windshield frames into tanks and through ovens without pause; capacity 3000 pieces in 9 hr.; installed in plant of Ternstedt Mfg. Co., Detroit.

Chemical Works. The Use of Conveyors in Chemical Works, H. Seymour. Chem. Age (Lond.), vol. 9, no. 232, Nov. 24, 1923, pp. 565–566. Discusses continuous and pneumatic conveyors.

Collapsible, for Cargo Handling. Telescopic Power Conveyor for Ship Cargo Handling, G. F. Nicholson. Belting, vol. 23, no. 5, Nov. 1923, pp. 31–32, 1 fig. Collapsible conveyor, it is claimed, will revolutionize vessel freight handling: designer describes equipment; capacity 125 tons per hr.

Shaking. The Operation of Shaking Conveyors with the Aid of Auxiliary Cylinders (Der Rutschenbetrieb mit Hilfszylindern), J. Soballa. Glückauf, vol. 59, no. 44, Nov. 3, 1923, pp. 1005–1009, 8 figs. Describes design and operation of auxiliary cylinders and arrangement and operation of a conveyor with such cylinders; advantages.

CORES

Corebox Construction. Large Core Box Construction, Jas. Edgar. Metal Industry, (Lond.) vol. 23, no. 22, Nov. 30, 1923, pp. 491–492, 4 figs. Methods of construction.

Drying. The Foundry of Messrs. Morris Motors, Limited, with Special Reference to Continuous Core Drying. Foundry Trade Jl., vol. 28, no. 381, Dec. 6, 1923, pp. 475–481, 13 figs. Details of foundry specializing exclusively in automobile castings; special feature of which is Lucas continuous core-drying plant.

Pipe. Cores and Arbors for Large and Ill-Shaped Pipes, J. F. Mullan. Can. Foundryman, vol. 14, no. 11, Nov. 1923, pp. 20–21, 3 figs. How cores are made for large ill-shaped pipe work; enormous waste-making arbor for each casting; sectional arbor can be removed easily and reassembled.

COUPLINGS

Selection and Application. Factors Affecting Use of Rigid and Compression Couplings When Employed in Connecting Line Shafting in the Mechanical Transmission of Power in Industrial Works, Frank E. Gooding. Indus. Engr., vol. 81, nos. 10, 11 and 12, Oct., Nov. and Dec. 1923, pp. 499–501 and 517–518; 529–533 and 564; and 579–583 and 590, 37 figs. Oct.: Use of rigid, sleeve, clamp and compression couplings. Nov.: Various types of flexible couplings, their characteristics and applications in connecting shafts of two machines in a direct line or of a driven machine to its driving mechanism. Dec.: Possible sources of trouble in operation attributed to flexible couplings, and considerations to be observed when installing them.

COST ACCOUNTING

Aerial Transportation. Cost Accounting in Aerial Transportation, Earl D. Osborn. Aviation, vol. 15, no. 21, Nov. 19, 1923, pp. 628–630. Problem of accountant is so to group elements of expense that directors may have clear mental picture of cost; maintenance ledger account; depreciation; miscellaneous accounts; cost records.

Inventory Methods. Making Short Work of Inventory Taking. Factory, vol. 31, no. 6, Dec. 1923, pp. 764–766, 4 figs. Plans and ideas used successfully by manufacturers in making inventory period a part of well-managed routine rather than cost confusion once or twice a year.

Value of. Is Our Investment in Cost Accounting Profitable? Thos. W. Howard. Factory, vol. 31, no. 6, Dec. 1923, pp. 760–761. Effective use of cost results.

CRANES

Bridge-Erecting. Large Bridge-Erecting Crane for India. Engineer, vol. 136, no. 3543, Nov. 23, 1923, pp. 566–567, 4 figs. To be used on North-Western Ry. of India for purpose of reconstructing and strengthening number of bridges on that system; total weight is 136 tons.

CUPOLAS

Blast Reheating. Note on Cupolas (Note sur les cubilots). Fonderie Moderne, vol. 17, Oct. 1923, pp. 337–343, 10 figs. Present status of question of reheating blast before it goes through tuyeres.

Iron Melting in. Describes Cupola Reactions, Jaime Coll. Foundry, vol. 51, no. 23, Dec. 1, 1923, pp. 961–962. Reference to and conclusions from contemporary literature on many phases incident to process of melting iron in cupola furnace. (Abstract.) Paper presented before Int. Foundry Congress, Paris.

Observes Melting in Cupola, John Grennan. Foundry, vol. 51, no. 22, Nov. 15, 1923, pp. 908–910, 1 fig. Conditions during heat observed through holes in cupola steel indicate melting takes place over extended length depending on variation of sections of stocks. Paper presented before Am. Foundrymen's Assn.

Schuermann. Preheat Blast in New Cupola. Foundry, vol. 51, no. 24, Dec. 15, 1923, pp. 994–996, 3 figs. Arrangement of refractory brick checkerwork conserves heat; blast passes transversely across cupola melting zone; pressure and exhaust fans used in new type of cupola invented by E. Schürmann, Dresden, Germany.

CURVES

Fitting. Method of Least Squares and Curve Fitting, H. S. Uhler. Optical Soc. Am.—Jl., vol. 7, no. 11, Nov. 1923, pp. 1043–1066. Author exposes certain tacit insidious potential sources of confusion permeating many writings on method of least squares and deduces compact rigorous formulas for all important cases that can arise in adjusting straight line to set of observed points in two dimensions.

D

DIE CASTING

Machines. Develop Die Casting Machine, E. B. Kreutzberg. Foundry, vol. 51, no. 24, Dec. 15, 1923, pp. 1000–1001, 2 figs. Device patented by E. N. Dollin, interesting feature of which is valve control apparatus by which air from high-pressure system exhausts into low-pressure system. See also Brass World, vol. 19, no. 11, Nov. 1923, pp. 365–366, 2 figs.

DIESEL ENGINES

Central-Station. The Economical Operation of Diesel Engine, C. Mendelsohn. Elec. World, vol. 82, no. 19, Nov. 10, 1923, pp. 970–971, 2 figs. Results obtained from Diesel-engine generating plant of two units in Arizona belonging to Old Dominion Co.; each unit comprises vertical 5-cylinder, 2-stroke-cycle Nordberg-Carels Diesel engine, with directly connected 850-kva., 2300-volt, 3-phase, 60-cycle a.c. generator.

Compressorless. Compressorless Diesel Engines (Kompressorlose Dieselmotoren), Otto Günther. Motorwagen, vol. 26, nos. 26, 28 and 29–30, Sept. 20, Oct. 10 and 20–31, 1923, pp. 387–392, 423–427 and 437–

Manufactured by Advertisers — CLASSIFIED LIST OF MECHANICAL EQUIPMENT — Alphabetical List on page 140

* Clarage Fan Co.
* Engberg's Electric & Mech. Wks.
* Erie City Iron Works
* Harrisburg Fdry. & Mach. Wks.
* Nordberg Mfg. Co.

Engines, Steam, Poppet Valve
* Erie City Iron Works
* Nordberg Mfg. Co.
* Vilter Mfg. Co.

Engines, Steam, Throttling
* Brownell Co.
* Clarage Fan Co.
* Engberg's Electric & Mech. Wks.

Engines, Steam, Uns-Flow
* Frick Co. (Inc.)
* Harrisburg Fdry. & Mach. Wks.
* Nordberg Mfg. Co.
Ridgway Dynamo & Engine Co.

Engines, Steam, Variable Speed
* Brownell Co.
* Harrisburg Fdry. & Mach. Wks.
* Nordberg Mfg. Co.

Engines, Steam, Vertical (Fully Enclosed, Self-Oiling)
* Clarage Fan Co.
* Engberg's Electric & Mech. Wks.
* Troy Engine & Machine Co.

Engines, Steering
Lidgerwood Mfg. Co

Evaporators
* Croll-Reynolds Engrg. Co. (Inc.)
Farrel Foundry & Machine Co.
* Vogt, Henry Machine Co.

Excavating Machinery
Clyde Iron Works Sales Co.
Lidgerwood Mfg. Co.
Link-Belt Co.

Exhaust Heads
Hoppes Mfg. Co.

Exhaust Systems
* Allington & Curtis Mfg. Co.
* American Blower Co.
* Clarage Fan Co.
* Sturtevant, B. F. Co.

Exhausters, Gas
* American Blower Co.
* Clarage Fan Co.
* General Electric Co.
* Green Fuel Economizer Co.
* Schutte & Koerting Co.
* Sturtevant, B. F. Co.

Extractors, Centrifugal
Fletcher Works
Tolhurst Machine Works

Extractors, Oil and Grease
* American Schaeffer & Budenberg Corp'n
* Kieley & Mueller (Inc.)

Factory Equipment, Metal
Manufacturing Equipment & Engrg. Co.

Fans, Exhaust
* American Blower Co.
* Clarage Fan Co.
* General Electric Co.
* Green Fuel Economizer Co.
Philadelphia Drying Mchry. Co.
* Sturtevant, B. F. Co.

Fans, Exhaust, Mine
* Sturtevant, B. F. Co.

Feeders, Pulverized Fuel
* Combustion Engineering Corp'n
* Fuller-Lehigh Co.
* Smidth, F. L. & Co.

Filters, Air
Reed Air Filter Co. (Inc.)

Filters, Gravity
* Permutit Co.

Filters, Oil
* Bowser, S. F. & Co. (Inc.)
Elliott Co.
* General Electric Co.
Nugent, Wm. W. & Co. (Inc.)

Filters, Pressure
* Graver Corp'n
* Permutit Co.

Filters, Water
Elliott Co.
* Graver Corp'n
* H. S. B. W.-Cochrane Corp'n
* Permutit Co.
* Scaife, Wm. B. & Sons Co.

Filtration Plants
* Graver Corp'n
* H. S. B. W.-Cochrane Corp'n
International Filter Co.
* Scaife, Wm. B. & Sons Co.

Fire Brick, Fire Hydrants, etc.
(See Brick, Hydrants, Fire, etc.)

Fittings, Ammonia
* Crane Co.
* De La Vergne Machine Co.
* Frick Co. (Inc.)
* Vilter Mfg. Co.
* Vogt, Henry Machine Co.

Fittings, Compression
* Bowser, S. F. & Co. (Inc.)
Lunkenheimer Co.

Fittings, Flanged
* Builders Iron Foundry
* Central Foundry Co.
* Crane Co.
* Edward Valve & Mfg. Co.
Kennedy Valve Mfg. Co.
Lunkenheimer Co.
* Pittsburgh Valve, Fdry. & Const. Co.
* Reading Steel Casting Co. (Inc.)
(Reading Valve & Fittings Div.)
* U. S. Cast Iron Pipe & Fdry. Co.
* Vogt, Henry Machine Co.

Fittings, Hydraulic
* Crane Co.
* Pittsburgh Valve, Fdry. & Const. Co.
* Reading Steel Casting Co. (Inc.)
(Reading Valve & Fittings Div.)
* Vogt, Henry Machine Co.

Fittings, Pipe
* Barco Mfg. Co.
* Central Foundry Co.
* Crane Co.
Kennedy Valve Mfg. Co.
Lunkenheimer Co.
* Pittsburgh Valve, Fdry. & Const. Co.
* Reading Steel Casting Co. (Inc.)
(Reading Valve & Fittings Div.)
Steere Engineering Co.
* Vogt, Henry Machine Co

Fittings, Steel
* Crane Co.
* Edward Valve & Mfg. Co.
Lunkenheimer Co.
* Pittsburgh Valve, Fdry. & Const. Co.
* Reading Steel Casting Co. (Inc.)
(Reading Valve & Fittings Div.)
Steere Engineering Co.
* Vogt, Henry Machine Co.

Flanges
* American Spiral Pipe Works
* Crane Co.
* Edward Valve & Mfg. Co.
Kennedy Valve Mfg. Co.
Lunkenheimer Co.
* Pittsburgh Valve, Fdry. & Const. Co.
* Reading Steel Casting Co. (Inc.)
(Reading Valve & Fittings Div.)
* Vogt, Henry Machine Co.

Flanges, Forged Steel
Cann & Saul Steel Co.

Floor Armor
* Irving Iron Works Co.

Floor Stands
* Chapman Valve Mfg. Co.
* Crane Co.
* Jones, W. A. Fdry. & Mach. Co.
Kennedy Valve Mfg. Co.
Lunkenheimer Co.
* Pittsburgh Valve, Fdry. & Const. Co.
* Reading Steel Casting Co. (Inc.)
(Pratt & Cady Division)
* Schutte & Koerting Co.
* Wood's, T. B. Sons Co.

Flooring-Grating
* Irving Iron Works Co.

Flooring, Metallic
* Irving Iron Works Co.

Flooring, Rubber
* United States Rubber Co.

Flour Milling Machinery
* Allis-Chalmers Mfg. Co.

Flue Gas Analysis Apparatus
* Tagliabue, C. J. Mfg. Co.

Fly Wheels
* Medart Co.
* Nordberg Mfg. Co.
* Wood's, T. B. Sons Co.

Fonts, Outdoor Bubble
Murdock Mfg. & Supply Co.

Forgings, Drop
* Vogt, Henry Machine Co.

Forgings, Hammered
Cann & Saul Steel Co.

Forgings, Iron and Steel
Cann & Saul Steel Co

Foundry Equipment
Northern Engineering Works
* Whiting Corp'n

Friction Clutches, Hoists, etc.
(See Clutches, Hoists, etc., Friction)

Friction Drives
Rockwood Mfg. Co.

Frictions, Paper and Iron
Link-Belt Co.
Rockwood Mfg. Co.

Fuel Economizers
(See Economizers, Fuel)

Furnace Construction
Furnace Engineering Co.

Furnaces, Annealing and Tempering
* General Electric Co.
* Kenworthy, Chas. F. (Inc.)
* Whiting Corp'n

Furnaces, Boiler
* American Engineering Co.
* American Spiral Pipe Wks.
* Babcock & Wilcox Co.
* Bernitz Furnace Appliance Co.
* Combustion Engineering Corp'n
* Detroit Stoker Co.
* Riley, Sanford Stoker Co.

Furnaces, Case Hardening
* Kenworthy, Chas. F. (Inc.)

Furnaces, Down Draft
* O'Brien, John Boiler Works Co.

Furnaces, Electric
Detroit Electric Furnace Co.
* Kenworthy, Chas. F. (Inc.)

Furnaces, Forging
* Kenworthy, Chas. F. (Inc.)

Furnaces, Hardening
* Kenworthy, Chas. F. (Inc.)

Furnaces, Heat Treating
* General Electric Co.
* Kenworthy, Chas. F. (Inc.)

Furnaces, Melting
Detroit Electric Furnace Co.
* General Electric Co.
* Whiting Corp'n

Furnace, Non-Ferrous
Detroit Electric Furnace Co.

Furnaces, Non-Oxidizing
* Kenworthy, Chas. F. (Inc.)

Furnaces, Powdered Coal
Grindle Fuel Equipment Co.

Furnaces, Smokeless
* American Engineering Co.
* Babcock & Wilcox Co.
* Combustion Engineering Corp'n
* Detroit Stoker Co.
Herbert Boiler Co.
* Riley, Sanford Stoker Co.

Fuses
* General Electric Co.
Johns-Manville (Inc.)

Gage Boards
* American Schaeffer & Budenberg Corp'n
* Ashton Valve Co.
* Crosby Steam Gage & Valve Co.

Gage Glasses
* American Schaeffer & Budenberg Corp'n

Gage Glasses, Inclined
Sesure Water Gauge Co.

Gage Testers
* American Schaeffer & Budenberg Corp'n
* Ashton Valve Co.
* Crosby Steam Gage & Valve Co.

Gages, Altitudes
* American Schaeffer & Budenberg Corp'n
* Ashton Valve Co.
* Crosby Steam Gage & Valve Co.

Gages, Ammonia
* American Schaeffer & Budenberg Corp'n
* Ashton Valve Co.
* Crosby Steam Gage & Valve Co.
* Vogt, Henry Machine Co.

Gages, Differential Pressure
* American Schaeffer & Budenberg Corp'n
Bacharach Industrial Instrument Co.
* Bailey Meter Co.
* Tagliabue, C. J. Mfg. Co.
* Uehling Instrument Co.

Gages, Draft
* American Schaeffer & Budenberg Corp'n
* Ashton Valve Co.
Bacharach Industrial Instrument Co.
* Bailey Meter Co.
* Bristol Co.
* Tagliabue, C. J. Mfg. Co.
* Taylor Instrument Cos.
* Uehling Instrument Co.

Gages, Hydraulic
* American Schaeffer & Budenberg Corp'n
* Ashton Valve Co.
* Crosby Steam Gage & Valve Co.

Gages, Liquid Level
* Bristol Co.
Lunkenheimer Co.
* Simplex Valve & Meter Co.

Gages, Loss of Head
* Builders Iron Foundry
* Simplex Valve & Meter Co.

Gages, Measuring (Surface, Depth, Dial, etc.)
* Norma Co. of America

Gages, Pressure
* American Schaeffer & Budenberg Corp'n
* Ashton Valve Co.
Bacharach Industrial Instrument Co.
* Bailey Meter Co.
* Bristol Co.
* Crosby Steam Gage & Valve Co.
* Tagliabue, C. J. Mfg. Co.
* Uehling Instrument Co.

Gages, Rate of Flow
Bacharach Industrial Instrument Co.
* Bailey Meter Co.
* Builders Iron Foundry
* Simplex Valve & Meter Co.

Gages, Syphon
* Tagliabue, C. J. Mfg. Co.

Gages, Vacuum
* American Schaeffer & Budenberg Corp'n
* Ashton Valve Co.
Bacharach Industrial Instrument Co.
* Bristol Co.
* Crosby Steam Gage & Valve Co.
* Tagliabue, C. J. Mfg. Co.
* Taylor Instrument Cos.
* Uehling Instrument Co.

Gages, Water
* American Schaeffer & Budenberg Corp'n
* Ashton Valve Co.
* Bristol Co.
* Crane Co.
* Jenkins Bros.
Lunkenheimer Co.
* Reading Steel Casting Co. (Inc.)
(Pratt & Cady Division)
* Simplex Valve & Meter Co.

Gages, Water Level
* American Schaeffer & Budenberg Corp'n
* Bristol Co.
Lunkenheimer Co.
* Simplex Valve & Meter Co.

Gas Plant Machinery
* Cole, R. D. Mfg. Co.
Steere Engineering Co.

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* Jenkins Bros.
Johns-Manville (Inc.)
* Sarco Co. (Inc.)

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Smooth-On Mfg. Co.

Gaskets, Rubber
* Goodrich, B. F. Rubber Co.
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Steere Engineering Co.

Gates, Cut-off
Easton Car & Construction Co.
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Gates, Sluice
* Chapman Valve Mfg. Co.
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Cann & Saul Steel Co.

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* Jones, W. A. Fdry. & Mach. Co.

Gear Hobbing Machines
* Jones, W. A. Fdry. & Mach. Co.

Gears, Bakelite
Ganschow, Wm. Co.

Gears, Cut
* Brown, A. & F. Co.
Chain Belt Co.

*Catalogue data of firms marked * appear in the A.S.M.E. Condensed Catalogues of Mechanical Equipment, 1923-24 Volume*

440, 12 figs. Modern development of Diesel engines with compressor for small and medium-size, slow- and high-speed machines; thermotechnical and economic conditions; recent theories on working process in Diesel engines, ignition-point testing, and combustion; influence of eliminating air of injection; description of principal German and foreign compressorless U-boat engines.

Crankshaft Fracture. Report on a Broken Crankshaft on a Diesel Engine at Bridgetown, Barbados, W. C. Shettle. Diesel Engine Users Assn.—advance paper, for meeting Oct. 5, 1923, 9 pp. including discussion, 5 figs. Describes fracture occurring in M. B. & D. 200-b.hp., 4-cylinder engine installed in 1911.

Marine, Europe. New European Diesel Experiments. Pac. Mar. Rev., vol. 20, no. 12, Dec. 1923, pp. 574–575, 2 figs. Survey of Diesel engines for marine propulsion in Europe; Diesel engines and plant of M. A. N., Augsburg, Bavaria; British Diesel engines and North British Diesel Engine Co.

DRAWINGS

Scheduling and Progress-Recording. Scheduling and Progress-Recording of Drawings, Irwin Hoffman. Machy. (N. Y.), vol. 30, no. 4, Dec. 1923, pp. 296–297, 4 figs. Describes system followed out and developed by writer which has proved successful in drafting rooms of large contracting company.

DRILLING MACHINES

Radial. Improved Universal Radial Drilling Machines. Machy. (Lond.), vol. 23, no. 581, Nov. 15, 1923, p. 201, 2 figs. Details of remodeled machines of Midgley & Sutcliffe, Bradford, England. See also description of new radial drilling machine by Scott Bros., Halifax, in same journal, pp. 215–216, 2 figs.

E

ECONOMIZERS

Design. Status of Economizer Construction and Its Future Development (Stand des Ekonomiserbaues und seine künftige Entwicklung), H. Seeberger. Wärme, vol. 46, nos. 42 and 44, Oct. 19 and Nov. 2, 1923, pp. 459–461 and 483–484, 1 fig. Investigation of purpose of economizer; designs and adjustment; injurious effect on strength of economizer through chemical influences, mechanical action and other operative influences; requirements of design to offset these injurious effects.

ELECTRIC FURNACES

Alloy-Melting. Improved Electric Melting Furnace for Alloys, T. F. Baily. Chem. & Met. Eng., vol. 29, no. 24, Dec. 10, 1923, pp. 1062–1063, 3 figs. New type of radiant dome electric furnace installed in plant of Miller Industries, Canton, O.

ELECTRIC LOCOMOTIVES

General Electric Co. Electric Locomotives for the Paris-Orleans Railway and the Mexican Railway. Ry. & Locomotive Eng., vol. 36, no. 12, Dec. 1923, pp. 380–381, 3 figs. Results of speed tests and description of new type built by Gen. Elec. Co. and Am. Locomotive Co. for French railway; also gives details and test esults of new locomotive for Mexican Ry. Co.

Industrial Plants. Saving upon Internal Transport, C. S. Darling. Power Engr., vol. 18, nos. 211 and 212, Oct. and Nov. 1923, pp. 370–374 and 414–416, 10 figs. Survey of requirements to be met by satisfactory locomotives for works use and description of typical suitable electric locomotives for this purpose; notes on costs.

Mexican Railway. Electric Locomotives for Mexican Railway, G. H. Walker. Ry. Age, vol. 75, no. 22, Dec. 1, 1923, pp. 1021–1023, 1 fig. Mechanical details of ten 150-ton 3000-volt d.c. locomotives for initial electrification of Mexican Railway Co., for freight and passenger service between Orizaba and Esperanza.

Passenger. Electric Locomotives Tested at Erie. Elec. Ry. Jl., vol. 62, no. 23, Dec. 8, 1923, pp. 968–970, 2 figs. Dimensions and data of 120-ton Paris-Orleans locomotive designed for high-speed passenger service, and of 150-ton Mexican Railway freight locomotive; Paris-Orleans locomotive developed 105 m. p.h. in preliminary tests; 150-ton locomotive has "tug-of-war" with Mikado-type steam engine. See also Ry. Age, vol. 75, no. 23, Dec. 8, 1923, pp. 1070–1071, 1 fig.

Twin-Motor Drive. Individual-Axle Drive by Twin Motors for Electric Locomotives, J. Werz. Elecn., vol. 91, no. 2372, Nov. 2, 1923, p. 488, 2 figs. Advantages of twin motor over single machine are said to be: smaller weight, smaller space occupied, better power factor, smaller inertia in rotating masses, series connection of two armatures (lighter apparatus), and simpler construction; disadvantages: more numerous bearings, limitations in lengths of motor axes, and inaccessibility of commutators. (Abstract.) Translated from Elektrotechnische Zeit.

ELECTRIC RAILWAYS

London, England. The Golders Green-Hendon Extension, London Electric Railway. Ry. Gaz., vol. 39, no. 21, Nov. 23, 1923, pp. 645–647, 9 figs. partly on pp. 650–651. Engineering features; notes on stations and signaling, traffic facilities and cost of new works, new rolling stock, train services and fares.

ELECTRIC WELDING

Locomotive Repair Shop. Electric Welding in a German Locomotive Repair Shop (Das elektrische Schweissen bei der Werkstatteninspektion Ingolstadt), H. Vollmayr. Organ für die Fortschritte des Eisenbahnwesens, vol. 78, no. 5, May 15, 1923, pp. 85–91, 10 figs. Describes methods employed; points out advantages of cold over hot welding.

ELECTRIC WELDING, ARC

Rail Bonds, Copper. Use of Mold Successful in Arc Welding Copper Rail Bonds, Chester F. Gailor. Elec. Ry. Jl., vol. 62, no. 24, Dec. 15, 1923, pp. 1001–1003, 4 figs. Describes two methods of arc welding, first employing a carbon electrode and second a copper alloy rod; figures of numerous bond tests.

Ships. Applications of Arc Welding to Ship Construction, E. H. Ewertz. Mar. Eng. & Shipg. Age, vol. 28, nos. 7, 8, 9, 10 and 12, July, Aug., Sept., Oct. and Dec. 1923, pp. 420–424 and 440, 480–491, 549–556, 625–630 and 774–778, 83 figs., 23 tables. Report prepared by author in coöperation with Elec. Arc Weld. Comm. of Am. Bur. Weld. Includes summary of present applications of welding as compared with riveting, description of arc-welded ships in existence and their performance, review of tests to demonstrate the adequacy of welding in ship construction, etc. (To be continued.)

Tanks. Arc Welding of Fuel Oil Tanks, Pliny P. Pipes. Am. Welding Soc.—Jl., vol. 2, no. 11, Nov. 1923, pp. 29–30. Brief description of construction, entirely by electric-arc-welding process, of four large fuel oil tanks in Equitable Building, New York City.

EMPLOYEES, TRAINING OF

Delco Instruction Course. Business Economics Taught to Workers at Delco Plant, Harry Tipper. Automotive Industries, vol. 49, no. 24, Dec. 13, 1923, pp. 1194–1195. Purpose of new course is to give employees clear conception of structure of industry and to develop individual thought.

Disabled. Training and Employment of Disabled Workmen in the Ford Plant. Monthly Labor Rev., vol. 17, no. 5, Nov. 1923, pp. 173–174. How disabled employees are placed so that their maximum ability can be realized.

ENAMELS

Red. United States Government Specification for Water-Resisting Red Enamel. U. S. Bur. Standards, Federal Specifications Board, Standard Specification No. 66, Sept. 25, 1923, 6 pp. Specification officially adopted by Federal Specifications Board on Sept. 1, 1923 for use of Departments and Independent Establishments of Government in purchase of this enamel; covers sampling, laboratory examination, and basis of purchase.

EVAPORATION

Multiple-Effect. Fundamental Principles of Multiple Effect Evaporation, Hugh K. Moore. Chem. & Met. Eng., vol. 29, no. 25, Dec. 17, 1923, pp. 1102–1105, 3 figs. Deals with fundamentals of process; evaporator design and operation; problem of evaporating waste sulphite liquor.

Pulp Industry. Some Evaporator Problems Met in the Paper Pulp Industry, George K. Spence. Chem. & Met. Eng., vol. 29, no. 22, Nov. 26, 1923, pp. 972–973. Critical review of processes and equipment from operator's viewpoint, both in soda and sulphate pulp mill and in sulphite mill.

The Case for the Multiple Effect Evaporator in the Pulp Mill, H. Austin. Chem. & Met. Eng., vol. 29, no. 22, Nov. 26, 1923, pp. 974–975, 1 fig. Recovery of black liquor has important bearing on problems of evaporator design and operation.

F

FERROALLOYS

Manufacture. The Manufacture of Ferro-Alloys, J. A. Holden. Foundry Trade Jl., vol. 28, nos. 375, 378, 380 and 381, Oct. 25, Nov. 15, 29, and Dec. 6, 1923, pp. 359–360, 418, 461–462 and 485. Oct. 25: Ferrochrome. Nov. 15: Ferrosilicon. Nov. 29: Thermit ferrotungsten. Dec. 6: Electric-furnace ferrotungsten.

FLIGHT

Ceiling. Note on the Graphical Resolution of the Equations of Horizontal Flight and the Determination of Ceiling (Note sur la résolution graphique des équations du vol horizontal et la détermination du plafond), M. Alayrac. Bul. Technique du Bureau Veritas, vol. 5, no. 9, Sept. 1923, pp. 184–186, 7 figs. Deduces graphical method from general conclusions on influence of various elements in conditions of flight, and indicates new method of determining ceiling which necessitates only construction of two curves.

Two-Dimensional Motion of Lamina. The Two-Dimensional Motion of a Lamina in a Resisting Medium under the Action of a Propeller Thrust, S. Lister. Lond., Edinburgh, & Dublin Philosophical Mag. & Jl. Sci., vol. 46, no. 275, Nov. 1923, pp. 819–827, 3 figs. Refers to investigation by Lanchester and Brodetsky of "phugoids" or "flight curves" of lamina moving in resisting medium under no external forces other than its own weight; present paper extends investigation by introduction of propeller thrust.

FLOW OF FLUIDS

Eddies in Air. On Eddies in Air, Hirata Nisi and A. W. Porter. Lond., Edinburgh, & Dublin Philosophical Mag. & Jl. Sci., vol. 46, no. 275, Nov. 1923, pp. 754–768, 18 figs. Deals with eddies which form in air which flows past obstacles of various forms.

FLOW OF WATER

Resistance of Structures in Rivers. The Resistance of Structures in Rivers and Other Open Channels against the Flowing Water (Der Widerstand von Einbauten in Flüssen und anderen offenen Gerinnen auf das strömende Wasser), H. Krey. Bautechnik, vol. 1, no. 40–41, Sept. 21, 1923, pp. 415–416, 3 figs. Describes method of calculation.

FLUE-GAS ANALYSIS

Duplex-Mono Recorder. The "Duplex-Mono" Flue Gas Recorder. Eng. & Boiler House Rev., vol. 37, no. 4, Oct.-Nov. 1923, pp. 108–110, 4 figs. Describes practical way of determining critical point in composition of flue gases where a furnace is working at its highest efficiency; describes Duplex-Mono instrument which automatically records both CO_2 and CO content.

Gas Sampling. Sampling of Boiler Flue Gases, T. G. Otley. S. African Instn. Engrs.—Jl., vol. 22, no. 3, Oct. 1923, pp. 37–40 (includes discussion), 1 fig. Note stressing difficulty of obtaining really reliable gas samples, and explaining why such divergent results are sometimes obtained by different observers on same test; gives results of experiments made showing variation of CO_2 percentage in products of combustion at various points across width of boiler uptake before entering economizer and across economizer uptake between economizer and chimney.

FLYING BOATS

All-Metal. The Aeromarine All-Metal Hull Flying Boat, P. G. Zimmerman. Metal Industry (N. Y.), vol. 21, no. 12, Dec. 1923, pp. 471–473, 3 figs. Describes latest development in aircraft construction; all-metal flying boat made possible by aluminum.

FOUNDRIES

Cleaning-Room Practice. Modern Cleaning Room Practice, Fred B. Jacobs. Abrasive Industry, vol. 4, no. 12, Dec. 1923, pp. 343–346, 5 figs. Cleaning room operations followed at plant of Allyne-Ryan Foundry Co., Cleveland, Ohio, where large numbers of automotive casting are produced daily.

Problems. The Present Position of Some Debatable Points in Foundry Practice, V. C. Faulkner. Foundry Trade Jl., vol. 28, no. 377, Nov. 8, 1923, pp. 390–392 and (discussion) 392–395. Discusses technical instruction, semi-steel, pearlitic cast iron and semi-steel, sulphur in cast steel, separating charges in cupola, and long-life molds.

FREIGHT HANDLING

Claim Prevention. Less Damage to Freight by Rough Handling, C. F. Polzin. Ry. Age, vol. 75, no. 23, Dec. 8, 1923, pp. 1057–1059, 2 figs. What locomotive engineer can do to help reduce claim and damage cause; timely and proper use of brake valves can help. Abstract of article which won prize offered by C. & N. W. Ry. for best paper on prevention of freight damage caused by rough handling.

Terminal Service. A Study in L. C. L. Freight Terminal Service. Ry. Rev., vol. 73, no. 21, Nov. 24, 1923, pp. 747–750, 6 figs. Chicago junction railway files new inbound less-than-carload freight service, supplementing previous similar arrangement for outbound less-than-carload freight which has been operating successfully; describes complete freight service, particularly in its aspect of affording terminal service in its combination with warehousing.

FUEL ECONOMY

Railways. The Fundamentals of Fuel Economy, W. L. Richards. Ry. Mech. Engr., vol. 97, no. 12, Dec. 1923, pp. 809–813. Points out evils of paper showings; mechanical factors; education and selection of employees. (Abstract.) Paper before Int. Ry. Fuel Assn.

FUELS

Coal-Slime Utilization. Utilization of Coal Slimes of High Ash and Low Volatile Content (Utilisation des schlamms cendreux et pauvres en matières volatiles), Ch. Hanot. Revue Universelle des Mines, vol. 19, no. 2, Oct. 15, 1923, pp. 79–114, 15 figs. Recovery and washing of slimes; combustion in hand- and stoker-fired furnaces; possible efficiencies and costs; consumption in gas producers or in pulverized form.

Low-Grade, Utilization of. Utilization of Low-Grade Fuels (Utilisation des combustibles inférieurs), A. Verbrugghen. Association des Ingénieurs Sortis des Ecoles Spéciales de Gand—Annales, vol. 13, no. 3, 1923, pp. 183–196. Discusses their utilization in pulverized form and without grinding in special furnaces.

Research. Some Aspects of the Fuel Problem, C. H. Lander. Chem. & Industry, vol. 42, no. 44, Nov. 2, 1923, pp. 1052–1056. Results of recent work carried out by Fuel Research Board, dealing with coal survey, methods of sampling and analysis, gas standards, steaming in vertical retorts, low-temperature carbonization, and power alcohol.

Sawdust. Wood-Shop Power Costs Reduced One-Fifth, M. G. Farrell. Foundry, vol. 27, no. 23, Dec. 1, 1923, pp. 1174–1177, 2 figs. Proper collection and use of mill refuse as fuel, and rearrangement and selection of motors principal factors in lowered cost in large plant for manufacture of agricultural implements.

[See also COAL; OIL FUEL; PULVERIZED COAL.]

FURNACES, ANNEALING

Testing. Practical Points on Testing Annealing Stoves. Foundry Trade Jl., vol. 28, no. 381, Dec. 6, 1923, p. 474. Points out advantages gained by employing draft gages.

FURNACES, HEAT-TREATING

Selection. Some Observations on Furnaces and Fuels Including the Electric Furnace for Heat Treating, E. F. Collins. Am. Soc. Steel Treating—Trans., vol. 4, no. 6, Dec. 1923, pp. 709–724 and (discussion) 724–726. Points out that furnaces should be fitted to processes rather than attempting to fit special processes to standard furnaces; adaptability of electric heat-treating furnace of metallic resistor type for carbon-steel heat treatment.

Manufactured by Advertisers

CLASSIFIED LIST OF MECHANICAL EQUIPMENT

Alphabetical List on page 140

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Johnson, Carlyle Machine Co.
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Link-Belt Co.
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Northern Engineering Works
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Gears, Fibre
* General Electric Co.
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Farrel Foundry & Machine Co.

Gears, Helical
Farrel Foundry& Machine Co.

Gears, Herringbone
* Falk Corporation
Farrel Foundry & Machine Co.
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Gears, Machine Molded
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Gears, Rawhide
Farrel Foundry & Machine Co.
Ganschow, Wm. Co.
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Chain Belt Co.
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Generators, Electric
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* De Laval Steam Turbine Co.
* Engberg's Electric & Mech. Wks.
* General Electric Co.
* Nordberg Mfg. Co.
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* Foster Engineering Co.

Governors, Engine, Oil
* Nordberg Mfg. Co.

Governors, Engine, Steam
* Nordberg Mfg. Co.

Governors, Oil Burner
* Foster Engineering Co.

Governors, Pressure
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* Edward Valve & Mfg. Co
* Foster Engineering Co.
* Kieley & Mueller (Inc.)
Squires, C. E. Co.
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Governors, Steam Turbine
* Foster Engineering Co.

Governors, Water Wheel
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* Dixon, Joseph Crucible Co.

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* Casey-Hedges Co.
* Combustion Engineering Corp'n
* Erie City Iron Works
* Titusville Iron Works Co.
* Vogt, Henry Machine Co.

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* Combustion Engineering Corp'n
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Grates, Rocking
* Brownell Co.

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(See Separators, Oil)

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Grinding Machinery, Knife
* American Machine & Foundry Co.

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* American Metal Treatment Co.

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* Long & Allstatter Co.

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* Wickes Boiler Co.
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Northern Engineering Works

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* Ingersoll-Rand Co.
* Nordberg Mfg. Co.
Northern Engineering Works
* Whiting Corp'n

Hoists, Belt
Clyde Iron Works Sales Co.
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Northern Engineering Works
Reading Chain & Block Corp'n
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Northern Engineering Works
Reading Chain & Block Corp'n
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* Carrier Engineering Corp'n
* Sturtevant, B. F. Co.
* Tagliabue, C. J. Mfg. Co.

Hydrants, Fire
Kennedy Valve Mfg. Co.
Murdock Mfg. & Supply Co.
* Reading Steel Casting Co. (Inc.)
(Pratt & Cady Division)
* Worthington Pump & Machinery Corp'n

Hydrants, Yard
Murdock Mfg. & Supply Co.

Hydraulic Machinery
* Allis-Chalmers Mfg. Co.
* Ingersoll-Rand Co.
Mackintosh-Hemphill Co.
* Worthington Pump & Machinery Corp'n

Hydraulic Press Control Systems (Oil Pressure)
* American Fluid Motors Co.

Hydrokineters
* Schutte & Koerting Co.

Hydrometers
* Tagliabue, C. J. Mfg. Co.
* Taylor Instrument Cos.

Hygrometers
* Tagliabue, C. J. Mfg. Co.
* Taylor Instrument Cos.
Weber, F. Co. (Inc.)

Ice Making Machinery
* De La Vergne Machine Co.
* Frick Co. (Inc.)
* Ingersoll-Rand Co.
Johns-Manville (Inc.)
* Nordberg Mfg. Co.
* Vilter Mfg. Co.
* Vogt, Henry Machine Co.

Ice Tools
* Gifford-Wood Co.

Idlers, Belt
* Smidth, F. L. & Co.

Indicator Posts
* Crane Co.
Kennedy Valve Mfg. Co.
* Reading Steel Casting Co. (Inc.)
(Pratt & Cady Division)

Indicators, CO
* Uehling Instrument Co.

Indicators, CO_2
Bacharach Industrial Instrument Co.
* Uehling Instrument Co.

Indicators, Engine
* American Schaeffer & Budenberg Corp'n
Bacharach Industrial Instrument Co.
* Crosby Steam Gage & Valve Co.

Indicators, Sight Flow
* Bowser, S. F. & Co. (Inc.)

Indicators, SO_2
* Uehling Instrument Co.

Indicators, Speed
* American Schaeffer & Budenberg Corp'n
Veeder Mfg. Co.
Weston Electrical Instrument Co.

Injectors
* Schutte & Koerting Co.

Injectors, Air
* Croll-Reynolds Engrg. Co.

Instruments, Electrical Measuring
* General Electric Co.
* Taylor Instrument Cos.
* Westinghouse Electric & Mfg.
Weston Electrical Instrument

Instruments, Oil Testing
* Tagliabue, C. J. Mfg. Co.

Instrument, Recording
* American Schaeffer & Budenber Corp'n
* Ashton Valve Co.
Bacharach Industrial Instrument Co.
* Baily Meter Co.
* Bristol Co.
* Builders Iron Foundry
* Crosby Steam Gage & Valve Co.
* General Electric Co.
* Tagliabue, C. J. Mfg. Co.

*Catalogue data of firms marked * appear in the A.S.M.E. Condensed Catalogues of Mechanical Equipment, 1923-24 Volume*

Temperature Regulation. "Heat Ports" Regulate Temperature Distribution. Fuels & Furnaces, vol. 1, no. 7, Nov. 1923, pp. 555–556, 2 figs. Describes furnace for heat treating various automobile parts, special features of which are heat ports for regulating distribution of temperature in various parts of heating chamber, and removable roof.

FURNACES, INDUSTRIAL

Hydraulic Theory of. Critical Study of Industrial Furnaces from the Standpoint of the Author's Theory Based on the Laws of Hydraulics (Etude critique des foyers industriels d'après la théorie de l'auteur basée sur les lois de l'hydraulique), W.-E. Groume-Grjimailo. Revue de Métallurgie, vol. 20, no. 10, Oct. 1923, pp. 687–693, 7 figs. Examination of Schurmann cupola, a steam boiler with preheated-air supply, and an open-hearth furnace with divided flame.

G

GAGES

Pitch Measurement. The Mechanical Measurement of Pitch, H. T. Wright. Machy. (Lond.), vol. 23, no. 582, Nov. 22, 1923, pp. 236–239, 8 figs. Method of recording and analysis of test results; describes pitch-measuring machines.

GALVANIZING

Crystallization Effects on Galvanized Iron. Crystallization Effects on Galvanized Iron, J. W. Hannah and E. L. Rhead. Inst. Metals—advance paper, no. 14, for meeting Sept. 10–13, 1923, 15 pp., 6 figs. Results of investigations show that spangle is independent of nature of steel sheet; pure zinc alone is incapable of producing spangle.

Hot Process. Developments in the Hot Galvanizing Process. Metal Industry (Lond.), vol. 23, no. 18, Nov. 2, 1923, pp. 386–387, 5 figs. Describes Austrian process and galvannealing process.

Welding Galvanized Vessels. How to Prevent Melting Off and Evaporation of the Galvanized Deposit in Welding Galvanized Iron Vessels (Wie ist das beim Schweissen verzinkter Eisenfässer auftretende Abschmelzen und Verdampfen der Verzinkung zu Behindern?), B. Haas. Zeit. für die gesamte Giessereipraxis, vol. 44, no. 37–38, Sept. 22, 1923, pp. 77–78. Points out that only means of combating effect of high welding heat is to cover welding surfaces and surrounding highly heated metal surfaces with such metal coatings as will at least retard development of vaporous zinc oxide and melting of galvanized deposit.

GAS ENGINES

Large. Large Gas Engines. Practical Engr., vol. 68, nos. 1913 and 1914, Oct. 25 and Nov. 1, 1923, pp. 235–236 and 248–249, 10 figs. Describes National engine, which is of vertical tandem high-speed type.

GAS PRODUCERS

Ash-Fusion. Investigations on the Operation of Ash-Fusion Gas Producers (Untersuchungen über den Betrieb des Abstichgaserzeugers), A. Wilhelmi. Stahl u. Eisen, vol. 43, no. 46, Nov. 15, 1923, pp. 1419–1427, 3 figs. Notes on design and operation; metallurgical phenomena; ash-fusion producer as blast furnace; maximum permissible ash content of fuel; economical features.

GASES

Air Entrainment by Jet of. The Entrainment of Air by a Jet of Gas issuing from a Small Orifice in a Thin Plate, J. S. G. Thomas and E. V. Evans. Lond., Edinburgh, & Dublin Philosophical Mag. & Jl. Sci., vol. 46, no. 275, Nov. 1923, pp. 785–801, 5 figs. Consideration of dependence of air entrainment by jet of gas upon density of gas in jet and upon density of air into which jet issues; experiments were confined to hydrogen, coal gas, air, and carbon dioxide.

Compressibility. On the Compressibility at 0 Deg. Cent. and Below 1 Atmos and the Deviation from the Avogadro Law of Oxygen, Hydrogen and CO_2 (Sur la compressibilité à 0° et au-dessous de 1 atmosphère et l'écart à la loi d'Avogadro de plusieurs gaz. I—Oxygène, hydrogène et anhydride carbonique), P. A. Guye and T. Batuecas. Journal de Chimie Physique, vol. 20, no. 3, Oct. 1, 1923, pp. 308–336, 4 figs. Results of extended experiments at laboratory of physical chemistry, Univ. of Geneva.

Volume Changes Under High Pressures. The Volume Changes of Five Gases Under High Pressures, P. W. Bridgman. Nat. Acad. Sciences—Proc., vol. 9, no. 11, Nov. 1923, pp. 370–372. Summarizes most important numerical results of a recent investigation on effect of pressure on volume of hydrogen, helium, ammonia, nitrogen, and argon.

GASOLINE

Vapor Pressure of. The Vapor Pressures of Gasolines and Light Petroleum Naphthas, F. H. Rhodes and E. B. McConnell. Indus. & Eng. Chem., vol. 15, no. 12, Dec. 1923, pp. 1273–1275, 5 figs. Method for exact determination of vapor pressures of gasoline; measurement of vapor pressures of several different types of gasolines and naphthas; it is shown that no general relation exists between vapor pressure of gasoline and its average distillation temperature or its density.

GEARS

Chucking for Grinding. Chucking Gears for Grinding. Eng. Production, vol. 6, no. 135, Dec. 1923, pp. 487–489, 14 figs. Details of number of efficient methods.

Design. New Applications of Involute Forms Developed in Recent Years, E. W. Miller. Automotive Industries, vol. 49, no. 22, Nov. 29, 1923, pp. 1108–1110, 7 figs. It is claimed that many toothed wheels are being made which cannot receive approval of engineers; close study of minute errors. (Abstract.) Paper read before Am. Gear Mfrs.' Assn.

Development of Industry. Development of the Gear Industry. E. W. Miller, Machy. (N. Y.), vol. 30, no. 4, Dec. 1923, pp. 265–269, 13 figs. Importance of finding new uses for gearing, and examples illustrating possibilities. (Abstract.) Paper read before Am. Mfrs.' Assn.

Manufacture. Attains Success Specializing in Gear Service, G. L. Ord. Can. Machy., vol. 30, no. 22, Nov. 29, 1923, pp. 13–17, 12 figs. Design and manufacture of gears at plant of Hamilton Gear and Machine Co., Toronto.

Milled, Analysis of. Analysis of Milled Gears, E. Wildhaber and E. Buckingham. Am. Mach., vol. 59, no. 21, Nov. 22, 1923, pp. 757–759. Determination of error in using cutter of wrong number; modification of cutting depth; excess depth of cut for backlash.

Testing. Modern Problems in Gear Testing and a Proposed Testing Machine, Wilfred Lewis. Am. Mach., vol. 59, no. 24, Dec. 13, 1923, pp. 875–881, 8 figs. Purpose of proposed tests will be determination of effect of varying degrees of tooth accuracy and varying velocities on strength of gear teeth. Paper read before Am. Gear Mfrs.' Assn.

GRINDING

Railway Shops. Grinding in the Railroad Shops, H. Campbell. Am. Mach., vol. 73, no. 24, Dec. 13, 1923, pp. 861–864, 14 figs. Illustrations and data collected from various shops where grinding machines are used on variety of work.

GRINDING MACHINES

Central-European Types. European Abrasive Equipment, B. Scrapira. Abrasive Industry, vol. 4, nos. 10, 11 and 12, Oct., Nov. and Dec. 1923, pp. 283–285, 321–322 and 356–357, 9 figs. Describes precision grinding machines of various types made by prominent Central-European machine-tool builders; three types of German grinding machines, vertical-spindle and disk-wheel-type surface grinders are in common use.

Gear. Automatic Gear Grinder. Iron Age, vol. 112, no. 25, Dec. 20, 1923, pp. 1649–1650, 3 figs. New unit, marketed by Fellows Gear Shaper Co., with adjustable involute control; separate instrument for detecting errors.

H

HACK-SAWING MACHINES

Blades. New Metal Sawing Blade Indicates Decided Improvement. Automotive Manufacturer, vol. 65, no. 8, Nov. 1923, pp. 7–9, 4 figs. Describes a hack-saw blade having a special patented set and an unusual shape of cutting edge, and the grinding and sawing machines developed for use with it; the three have been named Rapidor.

HANDLING MATERIALS

Barrel-Stacking Machine. A New Barrel-Stacking Machine. Indus. Management (Lond.), vol. 10, no. 10, Nov. 15, 1923, pp. 280–281, 1 fig. Device for handling barrels and objects of similar form, such as newsprint reels, drums, hogsheads of tobacco, etc.

Cost Accounting. Profit or Loss in Material Handling, Jas. A. Shepard. Management & Administration, vol. 6, no. 6, Dec. 1923, pp. 739–742. False burden figures are said to hide truth in most plants; economy of efficient handling methods.

Forge Shop. Well Planned Shop for Handling Material, D. L. Mathias. Forging—Stamping—Heat Treating, vol. 9, no. 11, Nov. 1923, pp. 464–466, 5 figs. Arrangement of Kropp Forge Co.'s plant reduces handling of fuel, raw steel and finished forgings to minimum; waste heat from furnaces used under boilers.

Open-Ground-Stored Materials. Storage of Minerals on Open Ground: Considered in Relation to Reclaiming Requirements, Herbert Blyth. Chem. Age (Lond.), vol. 9, no. 232, Nov. 24, 1923, pp. 562–564, 7 figs. Problem of storing minerals on large open spaces considered in relation to necessity for frequent and complete recovery of material from stock heap without hand labor. Describes four systems which provide for double duty of dumping and reclaiming, viz., conveyor method, simple transporter system with fixed track, transporter operating on rotating gantry, and traveling telpher bridge switched to telpher track.

Warehouses. Materials Handling in the Warehouse, M. W. Potts. Indus. Management (N. Y.), vol. 66, no. 6, Dec. 1923, pp. 337–343, 12 figs. How mechanical equipment increases capacity.

HANGARS

Dirigible. Reinforced-Concrete Airship Hangars Under Construction at the Villeneuve-Orly Airport (Hangars à dirigeables en ciment armé en construction à l'aéroport de Villeneuve-Orly), M. Freyssinet. Génie Civil, vol. 83, nos. 12, 13 and 14, Sept. 22, 29 and Oct. 6, 1923, pp. 265–273, 291–297 and 314–319, 48 figs. Details of design and construction of two hangars being constructed for dirigibles of very great dimensions; monolithic construction system used, replacing system based on use of precast elements.

HARDNESS

Brinell Numbers. Brinell Hardness Numbers, H. W. Brownsdon. Inst. Metals—advance paper, no. 2, for meeting Sept. 10–13, 1923, 2 pp. Points out desirability of expressing Brinell hardness numbers for non-ferrous metals on some rational basis, so that figures quoted by different authors may be comparable.

HEAT

Conservation of. Progress in the Development of Heat Conservation (Fortschritte in der Entwicklung der Wärmewirtschaft), H. Hilliger. Zeit. des Vereines deutscher Ingenieure, vol. 67, nos. 42 and 45, Oct. 20 and Nov. 10, 1923, pp. 981–984 and 1045–1048, 12 figs. Deals with recent tendencies in construction of grates in their relation to design of furnace; importance of pulverized-coal firing in fuel economy; discusses problems of boiler technique, with special reference to heat storage.

HEAT STORAGE

Methods. Thermal Storage, C. E. Stromeyer. Engineer, vol. 136, no. 3544, Nov. 30, 1923, pp. 582–583. Notes on how to supply hot water required in bleaching and similar works and how to supply steam for peak loads in power stations.

HEAT TRANSMISSION

Box Testing Method. Box Method for Determining Heat Transmission, Arthur J. Wood. Refrig. Eng., vol. 10, no. 5, Nov. 1923, pp. 172–179, 12 figs. Term "box method" applies to various types of calorimeters for determining constants of heat transmission; types of test boxes; advantages and disadvantages; apparatus and method of testing. Report of Insulation Committee.

Convection. Free and Forced Convection of Heat in Gases and Liquids, Chester W. Rice. Am. Inst. Elec. Engrs.—Jl., vol. 42, no. 12, Dec. 1923, pp. 1288–1289 and (discussion) 1289–1293, 4 figs. Discusses methods of attacking problem. (Abridged.)

Nusselt's Investigations. The Most Important Researches of W. Nusselt for the Determination of Heat Transmission (Die wichtigsten Forschungsarbeiten von W. Nusselt zur Bestimmung des Wärmeüberganges), H. Schmolke. Dinglers polytechnisches Jl., vol. 338, no. 17–18, Sept. 15, 1923, pp. 173–176. Review of works based on Nusselt's investigations.

Surface Transfer. Surface Transfer of Heat, T. S. Taylor. Refrig. Eng., vol. 10, no. 5, Nov. 1923, pp. 179–193, 9 figs. Discusses all factors involved in connection with transfer of heat from surface by all methods of heat flow. Report of Insulation Committee.

HEATING

Factories. Heating of Factories (Chauffage d'ateliers), H. Jenny. Bul. Technique de la Suisse Romande, vol. 49, nos. 17 and 18, Aug. 18 and Sept. 1, 1923, pp. 197–200 and 216–218, 18 figs. partly on pp. 215–218 and 219. Connection between lighting, heating and ventilating; separate heating and ventilating and combined heating and ventilating; hot-water and hot-air heating; waste-steam utilization.

Tubular System. A Tubular Electric Heating System. Engineer, vol. 136, no. 3545, Dec. 7, 1923, p. 614, 2 figs. Lightfoot tubular electric heating system originally devised for heating of explosives factories, where low-temperature heat, widely distributed, is required; now being further developed for industrial, commercial and domestic uses.

HEATING, HOUSE

Oil Burner for. The Heating of Houses with Oil, C. H. Chalmers. Am. Petroleum Inst.—advance paper, for meeting, Dec. 11–13, 1923, 8 pp. Notes on domestic oil burner and how it operates.

HOUSING

Garden-City Scheme, London. The Garden Cities of Letchworth and Welyn Near London (Les cités-jardins de Letchworth et de Welwyn, près de Londres), G. B. Lévy. Génie Civil, vol. 83, no. 19, Nov. 10, 1923, pp. 449–453, 6 figs. Details regarding two English model villages, their organization and financing, and advantages they offer to manufacturers.

Problems. Housing Problems in Relation to Industry, Bernard J. Newman. Engrs. & Eng., vol. 40, no. 11, Nov. 1923, pp. 294–298, 4 figs. Unsanitary housing, insofar as industrial workers are concerned. Results in drain upon physical stamina which is conducive to industrial overfatigue.

HYDRAULIC TURBINES

Characteristic Curves. The Characteristic Curves of Reaction and Impulse Turbines and of Centrifugal Pumps, H. W. Coultas. Beama, vol. 13, nos. 67 and 68, Nov. and Dec. 1923, pp. 304–312 and 370–374, 8 figs. Construction and application. Curves for a centrifugal pump.

Chemical Measurements. Recent Applications of Chemical Measuring Methods in Hydroelectric Plants in Dutch East Indies (Over eenige recente toepassingen der chemische debietmeetmethode bij den dienst voor waterkracht en electriciteit in Nederlandsch-Indië), C. G. J. Vreedenburgh. Waterstaats Ingenieur, vol. 11, no. 5, May 1923, pp. 135–145, 21 figs. on supp. plates. Chemical measurement on one of the newly erected turbine sets in hydroelectric station at Bengkok for control of useful effect guaranteed by makers.

Design and Development. Waterwheel Construction and Governing, E. M. Breed. Am. Inst. Elec. Engrs.—Jl., vol. 42, no. 12, Dec. 1923, pp. 1261–1263. Review of developments; problems of design; advantages gained by use of propeller-type runner.

Draft Tubes. On the Dynamic Similarity of a Draft Tube and Its Model (Sur la similitude dynamique d'un tube d'aspiration et de son modèle), A. Foch. Académie des Sciences—Comptes Rendus, vol. 177, no. 19, Nov. 5, 1923, pp. 868–869. Shows how efficiency of a draft tube can be determined from tests of a small model.

Governors. Governors for Hydraulic Turbines,

Manufactured by Advertisers

CLASSIFIED LIST OF MECHANICAL EQUIPMENT

Alphabetical List on page 140

* Taylor Instrument Cos.
* Uehling Instrument Co.
* Westinghouse Electric & Mfg. Co.

Instruments, Scientific
* Taylor Instrument Cos.
Weber, F. Co. (Inc.)

Instrument, Surveying
Dietzgen, Eugene Co.
Keuffel & Esser Co.
ParVell Laboratories
Weber, F. Co. (Inc.)

nsulating Materials (Electrical)
* General Electric Co.
Johns-Manville (Inc.)

Insulating Materials (Heat and Cold)
* Celite Products Co.
Johns-Manville (Inc.)
* King Refractories Co. (Inc.)
* Quigley Furnace Specialties Co.

Irrigation Systems
* Spray Engineering Co.

Joints, Expansion
* Crane Co.
* Croll-Reynolds Engineering Co.
Hamilton Copper & Brass Works
Lunkenheimer Co.
* Pittsburgh Valve, Fdry. & Const. Co.
* United States Rubber Co.
* Wheeler, C. H. Mfg. Co.

Joints, Flanged Pipe
* Crane Co.
* Pittsburgh Valve, Fdry. & Const. Co.

Joints, Flexible
* Barco Mfg. Co.

Joints, Swing and Swivel
* Barco Mfg. Co.
Lunkenheimer Co.

Kettles, Soda
Manufacturing Equipment & Engrg. Co.

Kettles, Steam Jacketed
* Cole, R. D. Mfg. Co.
* Nordberg Mfg. Co.
* Titusville Iron Works Co.

Keys, Machine
* Smith & Serrell
* Whitney Mfg. Co.

Keyseating Machines
* Whitney Mfg. Co.

Kilns, Dry (Brick, Lumber, Stone, etc.)
* American Blower Co.
* Sturtevant, B. F. Co.

Ladles
Northern Engineering Works
* Whiting Corp'n

Lamps, Incandescent
* General Electric Co.
Johns-Manville (Inc.)
* Westinghouse Electric & Mfg. Co.

Land-Clearing Machinery
Clyde Iron Works Sales Co.

Lathe Attachments, Pipe-Threading
* Curtis & Curtis Co.

Lathes, Automatic
* Jones & Lamson Machine Co.

Lathes, Brass
* Warner & Swasey Co.

Lathes, Chucking
* Jones & Lamson Machine Co.

Lathes, Engine
* Builders Iron Foundry

Lathes, Turret
* Jones & Lamson Machine Co.
* Warner & Swasey Co.

Levers, Flexible (Wire)
* Gwilliam Co.

Linings, Brake
Johns-Manville (Inc.)

Linings, Furnace
* Celite Products Co.
Johns-Manville (Inc.)
* King Refractories Co. (Inc.)
* McLeod & Henry Co.
* Quigley Furnace Specialties Co.

Linings, Stack
Johns-Manville (Inc.)

Loaders, Portable
* Gifford-Wood Co.
Link-Belt Co.

Lockers, Metal
Manufacturing Equip. & Engrg. Co.

Locomotives, Electric
* General Electric Co.
* Westinghouse Electric & Mfg. Co.

Locomotives, Storage Battery
* General Electric Co.
* Westinghouse Electric & Mfg. Co.

Logging Machinery
Clyde Iron Works Sales Co.
Lidgerwood Mfg. Co.

Looms
Fletcher Works

Lubricants
* Dixon, Joseph Crucible Co.
* Royersford Fdry. & Mach. Co.
Vacuum Oil Co.

Lubricating Systems
* Bowser, S. F. & Co. (Inc.)
Lunkenheimer Co.

Lubricators, Cylinder
* Bowser, S. F. & Co. (Inc.)
Lunkenheimer Co

Lubricators, Force-Feed
* Bowser, S. F. & Co. (Inc.)
Lunkenheimer Co.

Lubricators, Hydrostatic
* Crosby Steam Gage & Valve Co.
Lunkenheimer Co.

Lubricators (Sight Feed)
* Crosby Steam Gage & Valve Co.
Lunkenheimer Co.

Machine Tool Feed Control Systems (Oil Pressure)
* American Fluid Motors Co.

Machine Work
* American Machine & Foundry Co.
* Brown, A. & F. Co.
* Builders Iron Foundry
DuPont Engineering Co.
Farrel Foundry & Machine Co.
* Franklin Machine Co.
Johnson, Carlyle Machine Co.
* Jones, W. A. Fdry. & Mach. Co.
Lammert & Mann Co.
Link-Belt Co.
* Nordberg Mfg. Co.
Purvis Machine Co.

Machinery
(Is classified under the headings descriptive of character thereof)

Magnesia Products
Carey, Philip Co.

Manometers
Bacharach Industrial Instrument Co.
* Simplex Valve & Meter Co.

Mechanical Draft Apparatus
* American Blower Co.
* Clarage Fan Co.
* Green Fuel Economizer Co.
* Sturtevant, B. F. Co.

Mechanical Stokers
(See Stokers)

Metal Treating
* American Metal Treatment Co.

Metals, Perforated
* Hendrick Mfg. Co.

Meters, Air and Gas
Bacharach Industrial Instrument Co.
* Bailey Meter Co.
* Builders Iron Foundry
* General Electric Co.

Meters, Boiler Performance
* Bailey Meter Co.

Meters, Condensation
* Simplex Valve & Meter Co.

Meters, Electric
* General Electric Co.
* Westinghouse Electric & Mfg. Co.
Weston Electrical Instrument Co.

Meters, Feed Water
* Bailey Meter Co.
* Builders Iron Foundry
* General Electric Co.
* H. S. B. W.-Cochrane Corp'n
Hoppes Mfg. Co.
* Simplex Valve & Meter Co.
* Worthington Pump & Machinery Corp'n

Meters, Flow
Bacharach Industrial Instrument Co.
* Bailey Meter Co.
* General Electric Co.
* H. S. B. W.-Cochrane Corp'n
* Simplex Valve & Meter Co.
* Spray Engineering Co.

Meters, Oil
* Bowser, S. F. & Co. (Inc.)
* General Electric Co.
* H. S. B. W.-Cochrane Corp'n
* Simplex Valve & Meter Co.
* Worthington Pump & Machinery Corp'n

Meters, Pitot Tube
* American Blower Co.
* Simplex Valve & Meter Co.

Meters, Steam
* Bailey Meter Co.
* Builders Iron Foundry
* General Electric Co.
* H. S. B. W.-Cochrane Corp'n

Meters, V-Notch
* Bailey Meter Co.
* General Electric Co.
* H. S. B. W.-Cochrane Corp'n

Meters, Venturi
* Builders Iron Foundry
* National Meter Co.
* Simplex Valve & Meter Co.

Meters, Water
* General Electric Co.
* H. S. B. W.-Cochrane Corp'n
Hoppes Mfg. Co.
* National Meter Co.
* Simplex Valve & Meter Co.
* Worthington Pump & Machinery Corp'n

Milling Machines, Hand
* Whitney Mfg. Co.

Milling Machines, Keyseat
* Whitney Mfg. Co.

Milling Machines, Plain
* Warner & Swasey Co.

Mills, Ball
* Allis-Chalmers Mfg. Co.
* Fuller-Lehigh Co.
* Smidth, F. L. & Co.
* Worthington Pump & Machinery Corp'n

Mills, Blooming and Slabbing
Mackintosh-Hemphill Co.

Mills, Grinding
Farrel Foundry & Machine Co.
* Smidth, F. L. & Co.

Mills, Sheet and Plate
Mackintosh-Hemphill Co

Mills, Structural, Rail and Bar
Mackintosh-Hemphill Co.

Mills, Tube
* Allis-Chalmers Mfg. Co.
* Smidth, F. L. & Co.
* Worthington Pump & Machinery Corp'n

Mining Machinery
* Allis-Chalmers Mfg. Co.
* General Electric Co.
* Ingersoll-Rand Co.
* Worthington Pump & Machinery Corp'n

Monel Metal
Driver-Harris Co.

Monorail Systems
(See Tramrail Systems, Overhead)

Motor-Generators
* Allis-Chalmers Mfg. Co.
* General Electric Co.
Ridgway Dynamo & Engine Co.
* Westinghouse Electric & Mfg. Co.

Motors, Electric
* Engberg's Electric & Mech. Wks.
* General Electric Co.
Master Electric Co.
* Sturtevant, B. F. Co.
* Westinghouse Electric & Mfg. Co.

Motors, Synchronous
Ridgway Dynamo & Engine Co.

Nickel, Sheet
Driver-Harris Co.

Nipple Threading Machines
* Landis Machine Co. (Inc.)

Nitrogen Gas
* Linde Air Products Co.

Nozzles, Aerating
* Spray Engineering Co.

Nozzles, Blast
* Schutte & Koerting Co.

Nozzles, Sand and Air
Lunkenheimer Co.

Nozzles, Spray
* Cooling Tower Co. (Inc.)
* Schutte & Koerting Co.
* Spray Engineering Co.

Odometers
Veeder Mfg. Co.

Ohmeters
* General Electric Co.
Weston Electrical Instrument Co.

Oil and Grease Cups
* Bowser, S. F. & Co. (Inc.)
* Crane Co.
Lunkenheimer Co

Oil and Grease Guns
* Royersford Fdry. & Mach. Co.

Oil Burning Equipment
* Combustion Engineering Corp'n
* Schutte & Koerting Co.

Oil Filtering and Circulating Systems
* Bowser, S. F. & Co. (Inc.)
Nugent, Wm. W. & Co. (Inc.)

Oil Mill Machinery
* Worthington Pump & Machinery Corp'n

Oil Refinery Equipment
* Vogt, Henry Machine Co.

Oil Storage and Distributing Systems
* Bowser, S. F. & Co. (Inc.)

Oil Well Machinery
* Brownell Co.
* Ingersoll-Rand Co.
* Titusville Iron Works Co.
* Worthington Pump & Machinery Corp'n

Oiling Devices
* Bowser, S. F. & Co. (Inc.)
Lunkenheimer Co.
Nugent, Wm. W. & Co. (Inc.)

Oiling Systems
* Bowser, S. F. & Co. (Inc.)
Lunkenheimer Co.
Nugent, Wm. W. & Co. (Inc.)

Oils, Lubricating
Vacuum Oil Co.

Ore Handling Machinery
* Brown Hoisting Machinery Co.
Chain Belt Co.
Link-Belt Co.

Ovens, Core
* Whiting Corporation

Oxy-Acetylene Supplies
* Linde Air Products Co.

Oxygen Gas
* Linde Air Products Co.

Packing, Ammonia
France Packing Co.
* Goodrich, B. F. Rubber Co.
* United States Rubber Co.

Packing, Asbestos
* Goodrich, B. F. Rubber Co.
Johns-Manville (Inc.)
Steel Mill Packing Co.

Packing, Hydraulic
France Packing Co.
* Goodrich, B. F. Rubber Co.
Johns-Manville (Inc.)
Steel Mill Packing Co.

Packing, Metallic
France Packing Co.
Johns-Manville (Inc.)
Steel Mill Packing Co.

Packing, Rod (Piston and Valve)
France Packing Co.
* Goodrich, B. F. Rubber Co.
* Jenkins Bros.
Johns-Manville (Inc.)
Steel Mill Packing Co.
* United States Rubber Co.

Packing, Rubber
* Goodrich, B. F. Rubber Co.
* Jenkins Bros.
Johns-Manville (Inc.)
* United States Rubber Co.

Packing, Sheet
* Goodrich, B. F. Rubber Co.
* Jenkins Bros.
Johns-Manville (Inc.)
Steel Mill Packing Co.
* United States Rubber Co.

*Catalogue data of firms marked * appear in the A.S.M.E. Condensed Catalogues of Mechanical Equipment, 1923-24 Volume*

R. M. White. Power Plant Eng., vol. 27, no. 23, Dec. 1, 1923, pp. 1178–1182, 11 figs. Recent improvements in design have consisted in simplification of details.

Kaplan. The Kaplan Turbine, F. Johnstone Taylor. Elec. Times, vol. 64, no. 1673, Nov. 8, 1923, pp. 471–472, 3 figs. Present-day development.

Selection. Choice of Turbines for Hydroelectric Stations (Criteri per l'impiego delle turbine nelle centrali idroelettriche), G. Gambardella. Elettrotecnica, vol. 10, no. 28, Oct. 5, 1923, pp. 669–672, 2 figs. Determination of type and fundamental characteristics of turbines to be installed, according to height of fall, quantity of available water and most convenient r.p.m. at which machines will run, necessary to get best efficiency; considers different types of turbines.

HYDROELECTRIC DEVELOPMENTS

Bavaria. Water Power in Bavaria. Times Trade & Eng. Supp., vol. 13, no. 279, Nov. 10, 1923, p. 217. Account of big development scheme begun in 1919, including laying of 1154 mi. of 110,000-volt transmission lines and building of 43 power stations and 11 large transformer stations; program of construction.

Switzerland. Construction Work in Connection With Conducting of Water of Lake Arnon to the Grade Eau (Les travaux d'amenée dans la Grande Eau des eaux de lac d'Arnon), P. Schmidhauser. Bul. Technique de la Suisse Romande, vol. 49, nos. 9, 11, 12, 13, 14, 15, 16, 18 and 19, Apr. 28, May 26, June 9, 23, July 7, 21, Aug. 4, Sept. 1 and 15, 1923, pp. 102–106, 125–129, 142–146, 154–157, 161–163, 173–178, 185–188, 213–216 and 225–228, 59 figs. Utilization of waters of Lake Arnon; describes hydroelectric system of Société Romande d'Electricité, and the Grande Eau concession; hydrographic data of Lake Arnon; details of construction and tunneling work; equipment; etc.

HYDROELECTRIC PLANTS

Glen Falls, N. Y. The Sherman Island Hydroelectric Development of the International Paper Company, B. R. Connell and W. T. O'Connell. Gen. Elec. Rev., vol. 26, no. 12, Dec. 1923 pp. 804–817, 14 figs. Describes problem of design and details of construction.

Niagara. Recent Hydroelectric Installations at Niagara (Les récentes installations hydroélectriques du Niagara), Firket. Association des Ingenieurs Electriciens Sortis de l'Institute Electrotechnique Montefiore, no. 6, Nov.-Dec. 1922 and no. 1, Jan. 1923, pp. 267–320 and 3–28, 21 figs. Describes works of Niagara Falls Power Co., Toronto Power Co., and Hydroelectric Power Commission of Ontario; new 100,000-hp. plant of Niagara Falls Power Co.; Queenston-Chippawa Development.

Off-Peak Load Utilization. Electrochemistry and Electrometallurgy of Surplus Electric Energy (L'Electro-chimie & l'electrométallurgie de l'energie électrique disponible), Curtel-Hulin. Revue d'Electrochimie & d'Electrométallurgie, vol. 17, nos. 2 and 3, Feb. and Mar. 1923, pp. 25–27 and 45–48. Discusses use of surplus hydroelectric energy in generating stations, and proposes electrochemical utilization, i.e., electrothermic by heating effect of current and electrolytic by transformation of electric energy into chemical energy; application to electric furnaces.

Spain. Electric Irrigation Plant at Los Almadenes, Spain (Les installations de la Sociedad electrica de Los Almadenes et de la Real Compania de Riegos de Levante), H. Desbarres. Revue Générale de l'Electricité, vol. 14, no. 13, Sept. 29, 1923, pp. 444–455, 14 figs. Describes pumping stations of Compania de Riegos de Levante for supplying water for irrigation of Alicante and Murcie regions, and the hydroelectric generating station at Los Alimadenes, of 12,600 hp., 6000 hp. of which is supplied to Compania de Riegos de Levante for its pumping stations, and rest distributed in Murcie and Alicante region.

Wales. The Cynwyd, North Wales, Hydro-Electric Station. Elec. Rev., vol. 93, no. 2398, Nov. 9, 1923, pp. 685–686, 2 figs. A 106-kw. installation designed and carried out by Gilbert Gilkes & Co., Kendal.

I

ICE MANUFACTURE

Electric Power in. Ice Making with Electric Power. Elec. World, vol. 82, no. 24, Dec. 15, 1923, pp. 1215–1218, 8 figs. Use of different types of motors; controls and switchboard layouts; typical high-speed and low-speed plants.

ICE PLANTS

Oil-Engine-Driven. Oil-Engine Drive Promotes Ice-Plant Efficiency, Robert G. Skerrett. Compressed Air Mag., vol. 28, no. 11, Nov. 1923, pp. 693–697, 14 figs. Description of equipment of Central Ice & Cold Storage Corp., at Vineland, N. J.; electric current for illuminating, handling ice in tank room and on loading platform, driving brine agitators, operating centrifugal pumps, etc., generated by 65-kw. dynamo directly connected to a 100-hp. Ingersoll-Rand oil engine running at 257 r.p.m.

Raw-Water. New Raw Water Ice Plant of Pittmans & Dean Co., Detroit. Ice & Refrigeration, vol. 65, no. 5, Nov. 1923, pp. 245–250, 10 figs. Description of a modern electrically driven plant, including general arrangement, machine room, refrigeration and mechanical equipment, ice-making system, ice-storage room, and electrical equipment; power consumption.

IMPACT TESTING

Notched-Bar Tests. The Significance of the Notched-Bar Test (Was haben wir an der Kerbschlagprobe?), P. Ludwik. Stahl u. Eisen, vol. 43, no. 46, Nov. 15, 1923, pp. 1427–1428. Author seeks to show that decrease in notched-bar toughness occurring when limit impact velocity is exceeded is attributable to too little cohesion in relation to internal friction.

INDUSTRIAL MANAGEMENT

Stores Management. Modern Practice in Stores Management, William D. Gordon. Indus. Management (N. Y.), vol. 65, nos. 5, 6 and vol. 66, nos. 3 and 6, May, June, Sept. and Dec. 1923, pp. 274–278, 375–378, 1 fig., 163–169, 7 figs. and 320–326, 6 figs. May: Effects of poor stores system; Dewey decimal and mnemonic symbol systems for classification. June: Location and physical arrangement. Sept.: Planned production and storeroom operation. Dec.: Stores accounting.

INDUSTRIAL RELATIONS

Employee's Magazine. Making the Employee Publication Really Pay, D. C. Vandercook. Factory, vol. 31, nos. 5, and 6, Nov. and Dec. 1923, pp. 613–615 and 644 and 646; and 755–756, 778, 780, 782, 784, 786 and 788. Nov.: Management's share in helping its personnel magazine to succeed. Dec.: Personel director and editor—their jobs.

INSTRUMENTS

Mechanical, Life Testing of. Life Testing of Mechanical Instruments, Frederick J. Schlink. Optical Soc. Am.—Jl., vol. 7, no. 11, Nov. 1923, pp. 1031–1042. Selection of specimens for test; preparation for test; maintenance during test; nature of mechanical wear; limitations and special features of forced test. Part of report of Am. Soc. Mech. Engrs.' special research committee on permanency and accuracy of engineering instruments.

INTERNAL-COMBUSTION ENGINES

Admission and Exhaust Elements. Study of Admission and Exhaust Elements of Internal-Combustion Engines (Etude des Organes d'alimentation des moteurs à combustion interne), O. Lepersonne. Technique Automobile et Aérienne, vol. 14, no. 122, 1923, pp. 83–93, 13 figs. Calculation of dimensions of admission and exhaust pipes, of angles of opening and closing of admission and exhaust valves, and of pressure in cylinder at end of suction stroke.

Development. History and Development of the Internal-Combustion Engine and the Motor Ship, John H. Narbeth. Steamship, vol. 34, nos. 403, 404, 405, 406, 408, 409, 410, 411, 412, 413 and 414, Jan., Feb., Mar., Apr., June, July, Aug., Sept., Oct., Nov. and Dec. 1923, pp. 208–214, 251–258, 279–286, 311–318, 374–380, 9–15, 44–53, 80–83, 108–114, 140–142 and 172–174, 51 figs. Jan.: Diesel's position, work and early engines; first British-built Diesel engine; solid-injection engines. Feb.: Russia's start in 1902; Noble 2- and 4-stroke engines. Mar.: Early discussions in United Kingdom. Apr.: Sulzer Bros.; Atlas Diesel Co.—polar engines; early M. A. N., Carels-Diesel, Krupp, Junkers and Burmeister & Wain engines. June: Gasoline and Diesel-driven submarines; Vickers' engines, works and improvements; Fullagar engines. July: Doxford and North British Diesel engines. Aug.: Still engine. Sept. and Oct.: General European progress, 1912–20. Nov. and Dec.: United States progress—notable ships.

Exhaust and Scavenging Process. The Exhaust and Scavenging Process in Two-Stroke Engines (Der Auspuff- und Spülvorgang bei Zweitaktmaschinen), M. Ringwald. Zeit. des Vereines deutscher Ingenieure, vol. 67, nos. 46 and 47–48, Nov. 17 and 24, 1923, pp. 1057–1061 and 1079–1082, 15 figs. Laws are derived, and it is shown how conclusions can be drawn from experimental results on engines of other size and speed.

Manifolds, Hot-Spot. Temperature Requirements of Hot Spot Manifolds, C. S. Kegerreis and O. C. Berry. Purdue Univ.—Bul., vol. 7, no. 10, Sept. 1923, 42 pp., 29 figs. Details of investigations to determine temperatures required for vaporization of different fuels at high rates, and temperatures available in exhaust under different running conditions, and results obtained.

Shock Reduction. Shocks in Piston Engines (Einiges über die Stösse bei Kolbenmaschinen), Arthur Balogh. Wirtschaftsmotor, vol. 5, no. 8–9, Sept. 25, 1923, pp. 12–13. In order to reduce shocks in piston engines during working period, a critical number of revolutions is determined based on condition that no change in direction of forces takes place.

Vibrations. Effects Produced by Vibrations in Internal-Combustion Engines, J. Geiger. Power, vol. 58, no. 24, Dec. 11, 1923, pp. 964–965. Vibrations felt a mile away; preventive measures that have proved successful. Translated from paper read before Assn. German Engineers (V. d. I.).

[See also AUTOMOBILE ENGINES; DIESEL ENGINES; GAS ENGINES; OIL ENGINES; SEMI-DIESEL ENGINES.]

IRON CASTING

Channel Beams. Making Iron Channel Frames, H. R. Simonds. Foundry, vol. 51, no. 23, Dec. 1, 1923, pp. 933–937, 9 figs. Describes practice at Saco-Lowell foundry in Lowell, Mass., and successive steps in production of long channel beam castings for textile machinery.

Core Removal with Vibrator. Remove Cores with Vibrator. Foundry, vol. 51, no. 24, Dec. 15, 1923, pp. 984–985, 2 figs. Four special machines equipped with powerful vibrators at plant of Ferro Machine & Foundry Co., Cleveland, O., serve to remove cores and adhering sand from automobile cylinder castings at rate of 200 per hr.

Fine-Limit. Fine Limits in Foundry Practice, C. Dicken. Foundry Trade Jl., vol. 28, no. 377, Nov. 8, 1923, pp. 396–399, 11 figs. Timing-case cover; motor crankcase troubles; a striking fork difficulty; water-cooled cylinder; cupola practice.

Test Bars. Making and Testing Test Bars, J. S. Glen Primrose. Foundry Trade Jl., vol. 28, no. 380, Nov. 29, 1923, pp. 463–465 and (discussion) 465–466. Test bars for steel; testing wire and cast iron; position of cast-on bar; non-ferrous test bars; runners as test bars; tensile, transverse, compression, hardness, impact and torsion testing.

Test Bars, Rob. Buchanan. Foundry Trade Jl., vol. 28, no. 379, Nov. 22, 1923, pp. 440–442. Importance of grain size in test bar and castings; tensile test bars; tentative specifications for gray-iron castings; proposed specifications. Discussion.

L

LATHES

Bench. Recent Developments in Precision Bench Tools, B. A. Behrend. Am. Mach., vol. 59, nos. 17, 20 and 23, Oct. 25, Nov. 15 and Dec. 6, 1923, pp. 607–611, 719–722 and 829–831, 46 figs. Describes tools in use in author's mechanical laboratory.

Center. 32-Inch Centre Break Lathe. Machy. (Lond.), vol. 23, no. 583, Nov. 29, 1923, pp. 257–262, 9 figs. For turning, facing, boring, and screw-cutting operations on heavy hydraulic work.

Collets for Machining. How Rivett Makes Spring Collets. Am. Mach., vol. 73, no. 24, Dec. 13, 1923, pp. 865–867, 7 figs. Formed upon Gridley automatics; held upon centers in succeeding operations; final grinding.

Maudslay. A Maudslay Lathe. Practical Engr., vol. 68, no. 1917, Nov. 22, 1923, pp. 283–284, 1 fig. Describes foot lathe probably made about year 1800.

30-Ft. A 30-Ft. Lathe Built in San Francisco in 1865, Fred H. Colvin. Am. Mach., vol. 59, no. 23, Dec. 6, 1923, pp. 847–848, 4 figs. Built in shop of Miners Iron Works in 1865 and still in same shop where it is used for very large work from entire section.

Wheel. Construction and Individual Parts of a New Type Wheel Lathe, O. Krupski. Eng. Progress, vol. 4, no. 10, Oct. 1923, pp. 213–216, 6 figs. Details of lathe built by W. Hegenscheidt Corp., Ratibor, Germany, for machining wheels; profiles may be machined without cutting off piece; possibility of accurately centering piece fixed in; development of measuring equipment.

LOCOMOTIVE BOILERS

Crown Sheets. Designing the Crown Sheets of Locomotive Boilers, A. Wrench. Boiler Maker, vol. 23, no. 11, Nov. 1923, pp. 301–305, 29 figs. Outline of British methods of staying boilers compared with American practice.

Operation Efficiency. An Efficient Heat Interchange Apparatus, L. H. Fry. Mich. Technic, vol. 37, no. 1, Nov. 1923, pp. 12–14 and 30, 1 fig. Illustrates efficiency with which a well designed locomotive boiler operates and indicates sources of this efficiency; determination of quantity of heat radiated to firebox; heat transfer in flues.

LOCOMOTIVES

Fireboxes. Investigations on Low-Carbon-Steel Firebox Plates (Untersuchungen an flusseisernen Feuerbuchsblechen), R. Kühnel and M. Mohrmann. Glasers Annalen, vol. 93, nos. 7 and 8, Oct. 1 and 15, 1923, pp. 83–87 and 91–95, 16 figs. Discusses use of mild-steel in place of copper fireboxes.

Manufacture, England. Short Histories of Famous Firms. Engineer, vol. 136, no. 3543, Nov. 23, 1923, pp. 548–550, 11 figs. History of firm of Kitson & Co., Aeredale foundry, Leeds, and locomotives built by them since 1840.

Mikado. Mikado Locomotives for the Lehigh Valley. Ry. Age, vol. 75, no. 21, Nov. 24, 1923, pp. 959–960, 2 figs. Particulars of 2-8-2 freight locomotives recently built for Lehigh Valley Ry., order of 30 having been divided equally between Baldwin Locomotive Works and Am. Locomotive Co.

Mountain Type. Mountain Type Locomotive for Great Northern. Ry. Age, vol. 75, no. 23, Dec. 8, 1923, pp. 1065–1066, 2 figs. Particulars of 4-8-2 type locomotives for heavy passenger traffic replacing Pacific type; weight in working order 365,600 lb.; 54,830 lb. tractive force.

Overload Capacity. The Overload Capacity of Steam Locomotives (Ueber die Ueberlastungsfähigkeit der Dampflokomotiven), H. Severin. Organ für die Forstschritte des Eisenbahnwesens, vol. 78, no. 5, May 15, 1923, pp. 92–93. It is shown that overload capacity of steam locomotive is at least equal to that of electric locomotive, if it does not exceed it, due to fact that over-load capacity of latter is limited by heating of rotor.

Pacific Type. Canadian Pacific Standard 4-6-2 Locomotive. Ry. Mech. Engr., vol. 97, no. 12, Dec. 1923, pp. 803–808, 8 figs. Also Ry. Age, vol. 75, no. 24, Dec. 15, 1923, pp. 1107–1108, 1 fig. Heavy Pacific type with well-proportioned boiler; improvements in details.

Regulators. Multiple-Valve Locomotive Regulator. Engineering, vol. 116, no. 3021, Nov. 23, 1923, p. 648, 3 figs. Recently placed on market by Société Franco-Belge de Matériel de Chemins de Fer, La Croyère, Belgium, and known as Lejeune regulator; it is of multiple-valve type and it is claimed that valve remains completely steam-tight for long periods in service; advantages.

Repairing. Repairing Locomotives in Contract Shops, Fred H. Colvin. Am. Mach., vol. 59, no. 23, Dec. 6, 1923, pp. 833–834. Problems of shops repairing locomotives in place of their regular product; diversity in railway practice; Ford eliminated spring breakages; oil economy vs. repair costs.

Small Heavy. Small Heavy Locomotives. Blast Furnace & Steel Plant, vol. 11, no. 12, Dec. 1923, pp.

Manufactured by Advertisers — CLASSIFIED LIST OF MECHANICAL EQUIPMENT — Alphabetical List on page 140

Paints, Concrete (For Industrial Purposes)
Smooth-On Mfg. Co.

Paint, Metal
* Dixon, Joseph Crucible Co.
* General Electric Co.
Johns-Manville (Inc.)

Paper, Drawing
Dietzgen, Eugene Co.
Keuffel & Esser Co.
ParVell Laboratories
Weber, F. Co. (Inc.)

Paper Mill Machinery
Farrel Foundry & Machine Co.

Paper, Sensitized
Dietzgen, Eugene Co.
Keuffel & Esser Co.
ParVell Laboratories
Weber, F. Co. (Inc.)

Paraffine Wax Plant Equipment
* Vogt, Henry Machine Co.

Pasteurizers
* Vilter Mfg. Co.

Pattern Work
* American Machine & Foundry Co.
DuPont Engineering Co.

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American Lead Pencil Co.
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* Dixon, Joseph Crucible Co.
Keuffel & Esser Co.
ParVell Laboratories
Weber, F. Co. (Inc.)

Penstocks
Smith, S. Morgan Co.

Pile Drivers
Clyde Iron Works Sales Co.
Lidgerwood Mfg. Co.

Pinions, Rolling Mill
Mackintosh-Hemphill Co.

Pinions, Steel
* General Electric Co.

Pipe, Cast Iron
* Builders Iron Foundry
* Central Foundry Co.
* U. S. Cast Iron Pipe & Fdry. Co.

Pipe, Riveted
* American Spiral Pipe Wks.
* Springfield Boiler Co.
Steere Engineering Co.
* Titusville Iron Works Co.
* Walsh & Weidner Boiler Co.

Pipe, Soil
* Central Foundry Co.

Pipe, Steel
* Crane Co.
Steere Engineering Co.

Pipe, Welded
* American Spiral Pipe Wks.
* Crane Co.
* Pittsburgh Valve, Fdry. & Const. Co.
Steere Engineering Co.

Pipe, Wrought Iron
Byers, A. M. Company
* Crane Co.

Pipe Coils, Covering, Fittings, etc.
(See Coils, Covering, Fittings, etc., Pipe)

Pipe Cutting-off Machines
* Curtis & Curtis Co.

Pipe Cutting and Threading Machines
* Crane Co.
* Curtis & Curtis Co.
* Landis Machine Co. (Inc.)

Pipe Threading Machines
Treadwell Engineering Co.

Piping, Ammonia
* Frick Co. (Inc.)

Piping, Power
* Crane Co.
* Pittsburgh Valve, Fdry. & Const. Co.
Steere Engineering Co.
* Vogt, Henry Machine Co.

Pitot Tubes
(See Tubes, Pitot)

Planimeters
* American Schaeffer & Budenberg Corp'n
* Bristol Co.
* Crosby Steam Gage & Valve Co.
Dietzgen, Eugene Co.
Keuffel & Esser Co.
ParVell Laboratories
Weber, F. Co. (Inc.)

Plate Metal Work
(See Steel Plate Construction)

Platinum
Wilson, H. A. Co.

Pointers, Bolt
* Landis Machine Co. (Inc.)

Polishing Machinery
* Builders Iron Foundry
* Royersford Fdry. & Mach. Co.

Powdered Fuel Equipment (for Boiler and Metallurgical Furnaces)
* Allis-Chalmers Mfg. Co.
* Combustion Engineering Corp'n
* Fuller-Lehigh Co.
Grindle Fuel Equipment Co.
* Quigley Furnace Specialties Co.
* Smidth, F. L. & Co.
* Worthington Pump & Machinery Corp'n

Power Transmission Machinery
* Allis-Chalmers Mfg. Co.
* Brown, A. & F. Co.
Chain Belt Co.
* Falls Clutch & Machinery Co.
Farrel Foundry & Machine Co.
* Franklin Machine Co.
* General Electric Co.
* Hyatt Roller Bearing Co.
* Jones, W. A. Fdry. & Mach. Co.
Link-Belt Co.
* Medart Co.
* Morse Chain Co.
* Royersford Fdry. & Mach. Co.
* Smidth, F. L. & Co.
Smith, S. Morgan Co.
* Woods, T. B. Sons Co.

Presses, Baling
* Franklin Machine Co.
Philadelphia Drying Mchry. Co.

Presses, Draw
* Niagara Machine & Tool Works

Presses, Extruding
Farrel Foundry & Machine Co.

Presses, Foot
* Royersford Fdry. & Mach. Co.

Presses, Forming
Farrel Foundry & Machine Co.

Presses, Hydraulic
* Falls Clutch & Machinery Co.
Farrel Foundry & Machine Co.
Mackintosh-Hemphill Co.
Philadelphia Drying Mchry. Co.

Presses, Punching and Trimming
Long & Allstatter Co.
* Niagara Machine & Tool Works
* Royersford Fdry. & Mach. Co.

Presses, Sheet Metal Working
* Niagara Machine & Tool Works

Presses, Toggle
* Niagara Machine & Tool Works

Presses, Wax
* Vogt, Henry Machine Co.

Pressure Gages, Regulators, etc.
(See Gages, Regulators, etc., Pressure)

Producers, Gas
* De La Vergne Machine Co.
Otto Engine Works
* Westinghouse Electric & Mfg. Co
* Worthington Pump & Mchry. Corp'n

Propellers
* Morris Machine Works

Pulleys, Friction Clutch
* Allis-Chalmers Mfg. Co.
* Brown, A. & F. Co.
* Falls Clutch & Machinery Co.
Johnson, Carlyle Machine Co.
* Jones, W.A. Fdry. & Mach. Co.
Link-Belt Co.
* Medart Co.
* Wood's, T. B. Sons Co.

Pulleys, Iron
* Brown, A. & F. Co.
Chain Belt Co.
* Falls Clutch & Machinery Co.
* Gifford-Wood Co.
* Jones, W. A. Fdry. & Mach. Co.
Link-Belt Co.
* Medart Co.
* Wood's, T. B. Sons Co.

Pulleys, Paper
Rockwood Mfg. Co.

Pulleys, Steel
* Medart Co.

Pulleys, Wood
* Medart Co.

Pulling Tables (For Annealing Furnaces)
* Kenworthy, Chas. F. (Inc.)

Pulverizers
* Brown, A. & F. Co.
* Fuller-Lehigh Co.
* Smidth, F. L. & Co.

Pulverizers, Cement Materials
Pennsylvania Crusher Co.

Pulverizers, Coal
Grindle Fuel Equipment Co.
Pennsylvania Crusher Co.

Pulverizers, Limestone
Pennsylvania Crusher Co.

Pump Governors, Valves, etc.
(See Governors, Valves, etc. Pump)

Pumping Engines
(See Engines, Pumping)

Pumping Systems, Air Lift
* Ingersoll-Rand Co.

Pumps, Acid
Buffalo Steam Pump Co.
* Ingersoll-Rand Co.
* Nordberg Mfg. Co.
Taber Pump Co.
* Titusville Iron Works Co.

Pumps, Air
* Goulds Mfg. Co.
* Ingersoll-Rand Co.
* Westinghouse Electric & Mfg. Co.
* Wheeler, C. H. Mfg. Co.

Pumps, Ammonia
Buffalo Steam Pump Co.
* Goulds Mfg. Co.
* Ingersoll-Rand Co.
* Vogt, Henry Machine Co.
* Worthington Pump & Machinery Corp'n

Pumps, Boiler Feed
* Allis-Chalmers Mfg. Co.
Buffalo Steam Pump Co.
* De Laval Steam Turbine Co.
* Goulds Mfg. Co.
* Ingersoll-Rand Co.
* Kerr Turbine Co.
* Wheeler, C. H. Mfg. Co.
* Worthington Pump & Machinery Corp'n

Pumps, Centrifugal
* Allis-Chalmers Mfg. Co.
Buffalo Steam Pump Co.
* Cramp, Wm. & Sons Ship & Engine Bldg. Co.
* De Laval Steam Turbine Co.
* Goulds Mfg. Co.
* Ingersoll-Rand Co.
* Kerr Turbine Co.
Lammert & Mann Co.
* Morris Machine Works
* Nordberg Mfg. Co.
Taber Pump Co.
* Westinghouse Electric & Mfg. Co.
* Wheeler, C. H. Mfg. Co.
* Wheeler Cond. & Engrg. Co.
* Worthington Pump & Machinery Corp'n

Pumps, Condensation
Buffalo Steam Pump Co.
* Ingersoll-Rand Co.
* Wheeler, C. H. Mfg. Co.

Pumps, Deep Well
* Allis-Chalmers Mfg. Co.
* Goulds Mfg. Co.
* Ingersoll-Rand Co.
* Morris Machine Works
* Worthington Pump & Machinery Corp'n

Pumps, Dredging
* Ingersoll-Rand Co.
* Morris Machine Works
* Worthington Pump & Machinery Corp'n

Pumps, Electric
* Allis-Chalmers Mfg. Co.
Buffalo Steam Pump Co.
* Goulds Mfg. Co.
* Ingersoll-Rand Co.
* Morris Machine Works
* Nordberg Mfg. Co.
Taber Pump Co.
* Worthington Pump & Machinery Corp'n

Pumps, Elevator
Buffalo Steam Pump Co.
* Goulds Mfg. Co.
* Worthington Pump & Machinery Corp'n

Pumps, Filter Press
Buffalo Steam Pump Co.
* Goulds Mfg. Co.

Pumps, Hand
* Goulds Mfg. Co.
Taber Pump Co.

Pumps, Hydraulic
* American Fluid Motors Co.
Farrel Foundry & Machine Co.

Pumps, Hydraulic Pressure
Buffalo Steam Pump Co.
* Goulds Mfg. Co.
* Ingersoll-Rand Co.
* Morris Machine Works
* Worthington Pump & Machinery Corp'n

Pumps, Measuring
Wayne Tank & Pump Co.

Pumps, Measuring (Gasoline or Oil)
* Bowser, S. F. & Co. (Inc.)

Pumps, Oil
* Bowser, S. F. & Co. (Inc.)
Buffalo Steam Pump Co.
* Goulds Mfg. Co.
* Ingersoll-Rand Co.
Lunkenheimer Co.
Nugent, Wm. W. & Co. (Inc.)
Taber Pump Co.
* Worthington Pump & Machinery Corp'n

Pumps, Oil, Force-Feed
* Bowser, S. F. & Co. (Inc.)
* Goulds Mfg. Co.
Lunkenheimer Co.

Pumps, Oil (Hand)
* Bowser, S. F. & Co. (Inc.)
* Goulds Mfg. Co.
Lunkenheimer Co.
Nugent, Wm. W. & Co. (Inc.)

Pumps, Power
* Allis-Chalmers Mfg. Co.
Buffalo Steam Pump Co.
* Goulds Mfg. Co.
* Ingersoll-Rand Co.
* Nordberg Mfg. Co.
* Wheeler Cond. & Engrg. Co.
* Worthington Pump & Machinery Corp'n

Pumps, Rotary
* Goulds Mfg. Co.
Lammert & Mann Co.
Taber Pump Co.

Pumps, Steam
* Allis-Chalmers Mfg. Co.
Buffalo Steam Pump Co.
* Ingersoll-Rand Co.
* Nordberg Mfg. Co.
* Wheeler, C. H. Mfg. Co.
* Wheeler Cond. & Engrg. Co.
* Worthington Pump & Machinery Corp'n

Pumps, Sugar House
* Allis-Chalmers Mfg. Co.
Buffalo Steam Pump Co.
* Goulds Mfg. Co.
* Ingersoll-Rand Co.
* Worthington Pump & Machinery Corp'n

Pumps, Sump
Buffalo Steam Pump Co.
* Goulds Mfg. Co.
* Ingersoll-Rand Co.
* Morris Machine Works
* Smidth, F. L. & Co.
Taber Pump Co.

Pumps, Tank
Buffalo Steam Pump Co.
* Goulds Mfg. Co.
* Ingersoll-Rand Co.
Taber Pump Co.
* Wheeler, C. H. Mfg. Co.
* Wheeler Cond. & Engrg. Co.
* Worthington Pump & Machinery Corp'n

Pumps, Turbine
* Allis-Chalmers Mfg. Co.
Buffalo Steam Pump Co.
* De Laval Steam Turbine Co.
* General Electric Co.
* Goulds Mfg. Co.
* Ingersoll-Rand Co.
* Kerr Turbine Co.
* Morris Machine Works
* Westinghouse Electric & Mfg. Co.
* Worthington Pump & Machinery Corp'n

Pumps, Vacuum
Buffalo Steam Pump Co.
* Croll-Reynolds Engrg. Co. (Inc.)
* Goulds Mfg. Co.
* Ingersoll-Rand Co.
Lammert & Mann Co.
* Nordberg Mfg. Co.
* Wheeler, C. H. Mfg. Co.
* Wheeler Cond. & Engrg. Co.
* Worthington Pump & Machinery Corp'n

Punches, Multiple
* Long & Allstatter Co.
Mackintosh-Hemphill Co.

Punches, Power
* Niagara Machine & Tool Works
* Royersford Fdry. & Mach. Co.

*Catalogue data of firms marked * appear in the A.S.M.E. Condensed Catalogues of Mechanical Equipment, 1923-24 Volume*

633–634, 1 fig. Steel-mill limitations overcome by various departures from design principles; uniqueness lies principally in great weight carried on short wheel-base and narrow-gage track.

Standardization of Repair Parts. Standardization of Locomotive Repair Parts. M. H. Williams, Ry. Mech. Engr., vol. 97, nos. 8 and 9, Aug. and Sept. 1923, pp. 581–583 and 645–647, 6 figs. Aug.: Manufacturing and fitting standard knuckle, crank and crosshead pins requiring frequent renewal. Sept.: Methods of manufacturing and fitting standard taper frame bolts; reaming holes to step gages.

Steam-Turbine. The Ramsay Condensing Turbine Electric Locomotive. Ry. & Locomotive Eng., vol. 36, no. 12, Dec. 1923, pp. 371–373, 2 figs. New adaptation of turbine to locomotive.

Three-Cylinder. Three-Cylinder Freight Locomotive on the New York Central. Ry. & Locomotive Eng., vol. 36, no. 12, Dec. 1923, pp. 373–374, 1 fig. First application of 3-cylinder principle to heavy freight engine.

LUBRICATING OILS

Engine. Engine Lubrication and the Phenomena of Vicosity (Le problème du graissage dans les moteurs et les phénomènes de vicosité). N. Champsaur. Aérophile, vol. 31, nos. 15–16 and 17–18, Aug. 1–15 and Sept. 1–15, 1923, pp. 247–249 and 280–285, 10 figs. Lubricating power of oils; adhesion; vicosity.

Properties. Physical and Chemical Properties of Lubricating Oils (Caractères physiques et chimiques des huiles de graissage) J. Levy. Technique Moderne vol. 15, no. 21, Nov. 1, 1923, pp. 695–703, 8 figs. Influence of the various properties, such as density, volatility, vicosity, acidity, evaporification, etc., on lubrication.

Some Physical Properties of Lubricants. E. A. Evans, Instn. Petroleum Technologists—Jl., vol. 9, no. 39, Oct. 1923, pp. 380–384, 6 figs. Relative efficiencies of several oils. See also article by same author, entitled, Asphalt in Lubrication Oils, pp. 384–388.

M

MACHINE SHOPS

Idle Capital in. Idle Capital in the Machine Shop, A. Easthope. Eng. Production, vol. 6, no. 135, Dec. 1923, pp. 474–479 and (discussion) 479–481. Method of tabulating total weekly loss of capital occurring in non-use of machine tools, and necessary steps toward removing cause; trend of modern organization.

MACHINE TOOLS

Development, New England. Development of Machine Tools in New England. Guy Hubbard. Am. Mach., vol. 59, nos. 1, 4, 7, 9, 11, 14, 15, 16 and 25, July 5, 26, Aug. 16, 30, Sept. 13, 27, Oct. 11, 18 and Dec. 20, 1923, pp. 1–4, 139–142, 241–244, 311–315, 389–392, 463–465, 541–544, 579–581 and 919–922, 57 figs. July 5: Original settlers; difficulty of transportation; famous establishments. July 26: Beginning of iron industry; early high-pressure, double-acting steam engine. Aug. 16: Experiments with steam boats; gun-stock lathe. Aug. 30: Ornamental period in machine design; machine for ruling paper; history of dividing engine for graduating scales and rules. Sept. 13: Invention of bandsaw and rotary pumps. Sept. 27: Special machines for manufacturing rotary pumps; development of interchangeable system; working with convict labor. Oct. 11: Gun-making by interchangeable system; payments made by land. Oct. 18: Kendall underhammer rifles. Dec. 20: Making rifles for Government; plant for building cars; manufacture of Sharps rifle.

Railway-wheel Production. Machine Tools for Railway Wheel Production. Machy. (Lond.), vol. 23, nos. 580 and 583, Nov. 8 and 29, 1923, pp. 173–175, 6 figs. and 276–278, 5 figs. Lathes and boring mills made by Niles-Bement-Pond Co.

Typewriter Manufacture. Special Machines in a Typewriter Plant, C. Gabrielson. Machy. (Lond.), vol. 23, no. 583, Nov. 29, 1923, pp. 263–267, 9 figs. Unusual mechanisms incorporated in design of special high-production machines, used in plant of L. C. Smith & Bros. Typewriter Co.

MALLEABLE CASTINGS

Hardening. Tool Production from Hardened Malleable Iron, E. K. Smith. Can. Machy., vol. 30, no. 22, Nov. 29, 1923, pp. 21 and 38. Feasibility of hardening parts of malleable castings, nature of hardened product, and processes best adapted to hardening; advantages of malleable castings.

MANGANESE STEEL

Casting. Specializes Manganese Steel, H. E. Diller. Foundry, vol. 51, no. 22, Nov. 15, 1923, pp. 891–897, 14 figs. Methods and equipment of foundry of Taylor-Wharton Iron & Steel Co., High Bridge, N. J., which turned from production of car wheels and axles to casting manganese steel; melts ferromanganese in cupola for converter steel.

Characteristics. Characteristics of Some Manganese Steels, Jerome Strauss. Am. Soc. Steel Treating—Trans., vol. 4, no. 6, Dec. 1923, pp. 665–708, 17 figs. Review of previously published data and new metallographic survey, supplemented by mechanical tests, of portion of iron-carbon-manganese system; mechanical, electrical and magnetic properties of commercial manganese steels; constitution and possible improvements; directions in which manganese may prove useful as alloying element.

MEASURING INSTRUMENTS

Extensometer Amplifier. An Extensometer Amplifier, S. R. Williams. Optical Soc. Am.—Jl., vol. 7, no. 11, Nov. 1923, pp. 1011–1013, 3 figs. Details of device for multiplying effect of any linear displacement; outfit at present in use has multiplication factor of 65,000.

Generator Comparator. Measuring in Millionths of an Inch. Practical Engr., vol. 68, no. 1916, Nov. 16, 1923, pp. 273–274, 2 figs. Describes generator comparator used by makers, Pitter Gage & Precision Tool Co., Ltd., Eng., in process of manufacturing end gage bars; readily adapted to do all measurements which can be performed in ordinary anvil type of horizontal measuring machine.

Precision. Modern Precision Measuring Appliances for Mechanical Engineering. Eng. Progress, vol. 4, no. 10, Oct. 1923, pp. 201–212, 54 figs. Description is limited chiefly, but not exclusively, to instruments for measuring lengths; deals with fixed, limited, standard, adjustable, inside, depth and thickness gages; minimeters, measuring dials and machines, seating gages, measuring implements for threads, angle meters, etc.

Torsion Meter. Torsiometers for Measuring the Power of Steam Turbines (I torsiometri per la misura della potenza delle turbine a vapore), C. Bertella. Ingegneria, vol. 1, no. 6, Dec. 1, 1922 and vol. 2, no. 3, Mar. 1, 1923, pp. 146–151 and 69–75, 34 figs. Construction and operation of acoustic, mechanical, electrical and optical torsiometers.

METALS

Conductivity, Effect of Tension on. The Effect of Tension on the Thermal and Electrical Conductivity of Metals, P. W. Bridgman. Am. Acad. Arts & Sciences—Proc., vol. 59, no. 6, Nov. 1923, pp. 119–137, 2 figs. Develops improved method, and measures thermal conductivity under tension of seven metals and change of electrical conductivity under tension of same metals; theoretical discussion.

Corrosion Prevention. The Prevention of Corrosion. Chem. Age (Lond.), vol. 9, no. 232, Nov. 24, 1923, pp. 566–567. Reviews means which are now available for rendering metals non-corrodible; attention called in particular to use of stainless steels and quite recent progress which has been made with alloys of high nickel and chromium content.

Deformation Due to Rolling. Material Displacement in Connection with Rolling (Ueber die Materialverschiebung beim Walzen), G. Gredt. Stahl u. Eisen, vol. 43, no. 47, Nov. 22, 1923, pp. 1443–1449, 6 figs. Observation of relative change of segregation; confirmation of Rummel theory that deformation is independent of plasticity.

Deformation Under Compression. The Behaviour of Metals under Compressive Stresses, H. I. Coe. Inst. Metals—advance paper, no. 3, for meeting Sept. 10–13, 16 pp., 7 figs. Consideration of plastic deformation of tin under compressive stress; it is shown that tin becomes truly plastic at load corresponding to peak, then stiffens slightly, but subsequently becomes perfectly plastic again.

Failures. Metals in Engineering Service, Gordon Sproule. Eng. Jl., vol. 6, no. 12, Dec. 1923, pp. 523–530, 27 figs. Notes on design, choice of materials and inspection of failures.

Fatigue. "Fatigue" of Metals and the Basic Assumptions of Mechanics of Materials, H. F. Moore. Mich. Technique, vol. 37, no. 1, Nov. 1923, pp. 17–18 and 30, 2 figs. Discusses breakdown of metals under repeated stress.

Grain Structure. Structural Changes in Metals through Cold Working (Ueber Strukturänderungen in Metallen durch Kaltbearbeitung), M. Polanyi. Zeit. für Physik, vol. 17, no. 1, July 30, 1923, pp. 42–53. Refers to previous work in which explanation is given of the origin of grain structure under elongation of wires; certain points in this explanation are reconsidered and enlarged upon.

Lacquering. Blushing, Hugo Zeller. Metal Industry (N. Y.), vol. 21, no. 11, Nov. 1923, pp. 444–445. Causes and methods of prevention of conditions variously termed blushing, clouding or white troubles. See also Metal Industry (Lond.), vol. 23, no. 22, Nov. 30, 1923, p. 489.

Polishing. Polishing Methods Investigated, E. Farmer and R. S. Brooke. Abrasive Industry, vol. 4, nos. 9, 10, 11 and 12, Sept., Oct., Nov. and Dec. 1923, pp. 259–260, 287–289, 331–334 and 361–365, 4 figs. Description of British polishing practice. Production was expedited by installing seats and eye shields; loose abrasives used extensively; motion studies in buffing operations showed that no two operators followed like methods.

Rate of Cooling, Effect of. Effects of Rate of Cooling on the Density and Composition of Metals and Alloys, R. C. Reader. Inst. Metals—advance paper, no. 13, for meeting Sept. 10–13, 1923, 5 pp. Numerical values are recorded showing effect upon density and composition throughout mass of metals and alloys due to different rates of solidification.

Repeated Stresses, Behavior Under. The Behavior of Metals Subjected to Repeated Stresses, H. J. Gough. Roy. Soc.—Proc., vol. A-104, no. A-727, Nov. 1, 1923, pp. 538–655, 18 figs. partly on supp. plates. Review of previous work done; details of mechanical tests, and of study of microstructure of material when subjected to static tensile stresses and when subjected to reversed bending stresses.

Research. The German Metal-Research Society, Hubert Hermanns. Metal Industry (Lond.), vol. 23, no. 20, Nov. 16, 1923, pp. 439–440. Abstracts of papers read at meeting of Deutsche Gesellschaft für Metallkunde, on solidification of metals, ternary alloys, aluminum alloys, synthesizing pulverized metals, chromium plating and other deposits, single crystals, etc.

Testing. Metal Testing (Stato attuale della prova dei metalli), V. Prever. Ingegneria, vol. 2, nos. 5 and May 6, 1 and June 1, 1923, pp. 114–117 and 146–152, 20 figs. Discusses chemical and physical properties of alloy steels, composition, mechanical properties and their effects, etc., in connection with Fiat metallurgical laboratory at Turino.

Volume Change During Solidification. On the Measurement of the Change of Volume in Metals during Solidification, Hikozô Endo. Inst. Metals—advance paper, no. 4, for meeting, Sept. 10–13, 17 pp., 2 figs. Results of measurements of change of volume during solidification or melting for number of metals having low melting points up to 1100 deg. cent.

MILLING CUTTERS

Helical Involute Teeth. Selection of Milling Cutters for Helical Involute Teeth, E. Wildhaber. Am. Mach., vol. 59, no. 25, Dec. 20, 1923, pp. 909–911, 5 figs. New formula for tooth number of formed milling cutter to cut helical involute teeth; based on mathematical principles and easy to use; different results from old formula.

MILLING MACHINES

Universal. Universal Milling Machine. Eng. Progress, vol. 4, no. 10, Oct. 1923, pp. 212–213, 2 figs. Machine constructed by Mammut Werke, Nurnberg, has arrangement providing for two overhanging arms, eliminating shear-type connection between overhanging arm and knee still in vogue with all other types of milling machines.

MOLDING MACHINES

European Continental Practice. Continental Moulding Machine Practice, A. S. Beech. Foundry Trade Jl., vol. 28, no. 380, Nov. 29, 1923, pp. 451–456, 12 figs. Details progress made in Continental foundries in respect of pressure molding machines, and gives conclusions drawn by author from his experience.

MOLDING METHODS

Gating. Proper Gating an Important Factor in Molding, F. W. Best. Can. Foundryman, vol. 14, no. 11, Nov. 1923, pp. 15–16, 9 figs. Good metal poured into otherwise good molds may produce bad castings if mold is improperly gated; examples of gates and their characteristics.

Tubes, Small-Flanged. The Molding of Small Flanged Tubes, R. E. Search. Metal Industry (N. Y.), vol. 21, no. 11, Nov. 1923, pp. 435–437, 3 figs. Advantages and disadvantages of molding with flange above or below. Abstracted from Fonderie Moderne, May 1923.

MOLDS

Multiple, Made in Loam. Multiple Molds Made in Loam, J. H. Eastham. Foundry, vol. 51, no. 24, Dec. 15, 1923, pp. 1002–1003, 5 figs. This method, usually confined to production of small castings, may be adapted under certain conditions to large castings at saving in time and material.

MOTOR TRUCKS

All-Wheel Braking. All-Wheel Braking for Business Vehicles, Richard Twelvetrees. Motor Transport (Lond.), vol. 37, nos. 975, 976 and 977, Nov. 5, 12 and 19, 1923, pp. 553–554, 589–590 and 644–645, 10 figs. Some considerations affecting use of multi-wheel brakes in commercial service.

British Show. A Forecast of Olympia. Motor Transport (Lond.), vol. 37, no. 977, Nov. 19, 1923, pp. 621–639, 37 figs. Complete review of gasoline, gasoline-electric, electric, and steam vehicle, trailer, and bodywork exhibits at commercial motor transport and roads development exhibition at London, England.

The Commercial Motor Exhibition. Engineer, vol. 136, nos. 3544 and 3545, Nov. 30 and Dec. 7, 1923, pp. 580–582 and 608–613, 25 figs. Description of exhibits.

The Olympia Show. Motor Transport (Lond.), vol. 37, no. 978, Nov. 26, 1923. Gasoline and gasoline-electric vehicles, pp. 676–702, 108 figs.; electric vehicles, pp. 702–704, 9 figs.; steam trucks and tractors, pp. 705–709, 19 figs.; bodywork for passengers and goods, pp. 710–714, 18 figs.; trailer exhibits, pp. 715–716, 6 figs.; accessories, tires and components, pp. 717–724, 24 figs.

Dennis. 20–25 Cwt. Dennis Design. Motor Transport (Lond.), vol. 37, no. 978, Nov. 26, 1923, pp. 729–731, 10 figs. Details of new design.

Electric. Details of the Laporte 5-Ton Truck (Caractéristiques des camions Laporte de 4/5 T.). Electricien, vol. 54, no. 1334, Oct. 15, 1923, pp. 459–461, 4 figs. Truck with rear wheels each driven by an independent motor; can climb short grades of 12 to 15 per cent without overheating motors; fed by 80 Tudor cells weighing 4000 lb. in all.

The Crochat 6-Ton Truck (Le camion Crochat de 6 tonnes type A-5). Electricien, vol. 54, no. 1334, Oct. 15, 1923, pp. 461–462, 1 fig. Brief particulars of a new battery-drive truck.

German. The Motor Trucks at the Berlin Automobile Exhibition 1923 (Die Lastkraftwagen auf der Berliner Automobil-Ausstellung 1923). Motorwagen, vol. 26, no. 28, Oct. 10, 1923, pp. 419–420. Brief description of exhibits.

Maudslay. New Maudslay Models. Motor Transport (Lond.), vol. 37, no. 979, Dec. 3, 1923, pp. 741–742, 5 figs. Details of 2-ton and 30-cwt. chassis.

Parts Interchangeability. Interchangeability of Parts in 5 Standard Models. Motor Transport (N. Y.), vol. 29, no. 8, Nov. 15, 1923, pp. 266–267, 2 figs. With exception of major units which are determined by speed and load characteristics, all parts for each size of truck (Standard Motor Truck Co.) are, insofar as possible, interchangeable.

Propeller-Shaft Brake. Disk Type Propeller Shaft Brake Used on New 2½-Ton Truck. Automotive Industries, vol. 49, no. 24, Dec. 13, 1923, pp. 1198–1199, 3 figs. Novel form adopted on new 2½-ton truck

Manufactured by Advertisers CLASSIFIED LIST OF MECHANICAL EQUIPMENT

Alphabetical List on page 140

Punches and Dies
* Royersford Fdry. & Mach. Co.

Punching and Coping Machines
* Long & Allstatter Co.

Punching and Shearing Machines
* Long & Allstatter Co.
* Royersford Fdry. & Mach. Co.

Purifiers, Ammonia
* Frick Co. (Inc.)

Purifiers, Oil
* Bowser, S. F. & Co. (Inc.)
Elliott Co.
Nugent, Wm. W. & Co. (Inc.)

Purifying and Softening Systems Water
International Filter Co.
* Scaife, Wm. B. & Sons Co.

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* American Schaeffer & Budenberg Corp'n
* Bristol Co.
* Crosby Steam Gage & Valve Co.
* Superheater Co.
* Taylor Instrument Cos.

Pyrometers, Expansion Stem
* Tagliabue, C. J. Mfg. Co.

Pyrometers, Optical
* Taylor Instrument Cos.

Pyrometers, Pneumatic
* Uehling Instrument Co.

Pyrometers, Radiation
* Taylor Instrument Cos.

Racks, Machine, Cut
* James, D. O. Mfg. Co.
* Jones, W. A. Fdry. & Mach. Co.

Racks, Storage, Metal
Manufacturing Equipment & Engrg. Co.

Radiators, Steam and Water
* American Radiator Co.
* Smith, H. B. Co.

Railways, Industrial
Easton Car & Construction Co.
Link-Belt Co.

Rams, Hydraulic
* Goulds Mfg. Co.
* Worthington Pump & Machinery Corp'n

Receivers, Air
* Brownell Co.
* Ingersoll-Rand Co.
* Scaife, Wm. B. & Sons Co.
* Walsh & Weidner Boiler Co.
* Wheeler Cond. & Engrg. Co.
* Worthington Pump & Machinery Corp'n

Receivers, Ammonia
* Frick Co. (Inc.)

Recorders, CO
* Tagliabue, C. J. Mfg. Co.
* Uehling Instrument Co.

Recorders, CO_2
* Tagliabue, C. J. Mfg. Co.
* Uehling Instrument Co.

Recorders, SO_2
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* Uehling Instrument Co.

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(See Instruments, Recording)

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* Drake Non-Clinkering Furnace Block Co.
Keystone Refractories Co.
* King Refractories Co. (Inc.)

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* De La Vergne Machine Co.
* Frick Co. (Inc.)
* Ingersoll-Rand Co.
Johns-Manville (Inc.)
* Nordberg Mfg. Co.
* Vilter Mfg. Co.
* Vogt, Henry Machine Co.
* Westinghouse Electric & Mfg. Co.

Regulators, Blower
* Davis, G. M. Regulator Co.
* Foster Engineering Co.

Regulators, Condensation
* Tagliabue, C. J. Mfg. Co.

Regulators, Damper
* Davis, G. M. Regulator Co.
* Fulton Co.
* Kieley & Mueller (Inc.)

Regulators, Electric
* General Electric Co.
* Westinghouse Electric & Mfg. Co.

Regulators, Fan Engine
* Foster Engineering Co.

Regulators, Feed Water
* Edward Valve & Mfg. Co.
Elliott Co.
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Squires, C. E. Co.

Regulators, Flow (Steam)
* Davis, G. M. Regulator Co.
* Schutte & Koerting Co.

Regulators, Humidity
* Fulton Co.
* Tagliabue, C. J. Mfg. Co.

Regulators, Hydraulic Pressure
* Foster Engineering Co.

Regulators, Liquid Level
* Tagliabue, C. J. Mfg. Co.

Regulators, Pressure
* Davis, G. M. Regulator Co.
* Edward Valve & Mfg. Co.
* Foster Engineering Co.
* Fulton Co.
* General Electric Co.
* Kieley & Mueller (Inc.)
* Tagliabue, C. J. Mfg. Co.
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Regulators, Pump
(See Governors, Pump)

Regulators, Temperature
* Bristol Co.
* Fulton Co.
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* Sarco Co. (Inc.)
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Regulators, Vacuum
* Foster Engineering Co.

Regulators, Time
* Tagliabue, C. J. Mfg. Co.

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* Spray Engineering Co.

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Cann & Saul Steel Co

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Mackintosh-Hemphill Co.

Riveters, Pneumatic
* Ingersoll-Rand Co.

Riveting Machines
* Long & Allstatter Co.

Roller Bearings
(See Bearings, Roller)

Rolling Mill Machinery
Farrel Foundry & Machine Co.
Mackintosh-Hemphill Co.
Treadwell Engineering Co.

Rolls, Bending
* Niagara Machine & Tool Works

Rolls, Crushing
Farrel Foundry & Machine Co.
Link-Belt Co.
* Worthington Pump & Machinery Corp'n

Rolls, Rubber
* Goodrich, B. F. Rubber Co.
* United States Rubber Co.

Rolls, Steel
Mackintosh-Hemphill Co

Roofing
Johns-Manville (Inc.)

Roofing, Asbestos
Johns-Manville (Inc.)

Roofing, Prepared
Carey, Philip Co.

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* Allis-Chalmers Mfg. Co.
* Brown, A. & F. Co.
* Falls Clutch & Machinery Co.
Link-Belt Co.
* Medart Co.
* Wood's, T. B. Sons Co.

Rope, Hoisting
Clyde Iron Works Sales Co.
* Roebling's, John A. Sons Co.

Rope, Transmission
Link-Belt Co.
* Roebling's, John A. Sons Co.

Rope, Wire
Clyde, Iron Works Sales Co.
* Roebling's, John A. Sons Co.

Rubber Goods, Mechanical
* Goodrich, B. F. Rubber Co.
* Jenkins Bros.
* United States Rubber Co.

Rubber Mill Machinery
Farrel Foundry & Machine Co.

Sand Blast Apparatus
* De La Vergne Machine Co.

Saw Mill Machinery
* Allis-Chalmers Mfg. Co.

Saw Mills, Portable
* Frick Co. (Inc.)

Scales, Fluid Pressure
* Crosby Steam Gage & Valve Co.

Screens, Perforated Metal
* Hendrick Mfg. Co.

Screens, Revolving
* Allis-Chalmers Mfg. Co.
Chain Belt Co.
* Gifford-Wood Co.
* Hendrick Mfg. Co.
Link-Belt Co.
* Smidth, F. L. & Co.

Screens, Shaking
* Allis-Chalmers Mfg. Co.
Chain Belt Co.
* Gifford-Wood Co.
* Hendrick Mfg. Co.
Link-Belt Co.

Screens, Water Intake (Traveling)
Chain Belt Co.
Link-Belt Co.

Screw Cutting Dies
(See Dies, Thread Cutting)

Screw Machines, Hand
* Jones & Lamson Mch. Co.
* Warner & Swasey Co.

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* Scovill Mfg. Co.

Screws, Safety Set
Allen Mfg. Co.
* Bristol Co.

Screws, Set
Allen Mfg. Co.

Separators, Ammonia
* De La Vergne Machine Co.
Elliott Co.
* Frick Co. (Inc.)
* Vogt, Henry Machine Co.

Separators, Oil
* Crane Co.
* De La Vergne Machine Co.
Elliott Co.
* H. S. B. W.-Cochrane Corp'n
Hoppes Mfg. Co.
* Kieley & Mueller (Inc.)
* Vogt, Henry Machine Co.

Separators, Steam
* Crane Co.
Elliott Co.
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Hoppes Mfg. Co.
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* Pittsburgh Valve, Fdry. & Const. Co.
* Vogt, Henry Machine Co.

Shafting
* Allis-Chalmers Mfg. Co.
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* Falls Clutch & Mchry. Co.
* Medart Co.
Union Drawn Steel Co.
* Wood's, T. B. Sons Co.

Shafting, Cold Drawn
* Medart Co.

Shafting, Flexible
* Gwilliam Co.

Shafting, Turned and Polished
Cumberland Steel Co.
Link-Belt Co.

Shapes, Brick
* McLeod & Henry Co.

Shapes, Cold Drawn Steel
Union Drawn Steel Co.

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Farrel Foundry & Machine Co.
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Mackintosh-Hemphill Co.

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Mackintosh-Hemphill Co.

Shears, Rotary
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Link-Belt Co.
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* Wood's, T. B. Sons Co.

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* Hendrick Mfg. Co.

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* United States Rubber Co.

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Weber, F. Co. (Inc.)

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* Sarco Co. (Inc.)

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(See Stacks, Steel)

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(See Wire Rope Fastenings)

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Diamond Power Specialty Corp'n

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* Brown, A. & F. Co.
* Builders Iron Foundry
* Cramp, Wm. & Sons Ship & Engine Bldg. Co.
DuPont Engineering Co.
Farrel Foundry & Machine Co.
* Fawcus Machine Co.
* Franklin Machine Co.
Lammert & Mann Co.
Mackintosh-Hemphill Co.
* Nordberg Mfg. Co.
Purvis Machine Co.
* Smidth, F. L. & Co.
* Vilter Mfg. Co.

Speed Reducing Transmissions
* Cleveland Worm & Gear Co.
* De Laval Steam Turbine Co.
* General Electric Co.
* James, D. O. Mfg. Co.
* Jones, W. A. Fdry. & Mach. Co.
Link-Belt Co.

Spray Cooling Systems
* Cooling Tower Co. (Inc.)
* Spray Engineering Co.

Sprays, Water
* Cooling Tower Co. (Inc.)
* Spray Engineering Co.

Sprinklers, Spray
* Cooling Tower Co. (Inc.)
* Spray Engineering Co.

Sprockets
Baldwin Chain & Mfg. Co
* Fuller-Lehigh Co.
* Gifford-Wood Co.
Link-Belt Co.
* Medart Co.
Philadelphia Gear Works

Stacks, Steel
* Bigelow Co.
* Brownell Co.
* Casey-Hedges Co.
* Cole, R. D. Mfg. Co.
* Hendrick Mfg. Co.
Morrison Boiler Co.
* Titusville Iron Works Co
* Union Iron Works
* Vogt, Henry Machine Co.
* Walsh & Weidner Boiler Co.

Stair Treads
* Irving Iron Works Co.

Standpipes
* Cole, R. D. Mfg. Co.
Morrison Boiler Co.
* Walsh & Weidner Boiler Co.

Standpipes, Concrete
Heine Chimney Co.

Steam Specialties
* Crane Co.
* Davis, G. M. Regulator Co.
* Foster Engineering Co.
* Fulton Co.
* Kieley & Mueller (Inc.)
Lunkenheimer Co
* Pittsburgh Valve, Fdry. & Const. Co.
* Sarco Co. (Inc.)

*Catalogue data of firms marked * appear in the A.S.M.E. Condensed Catalogues of Mechanical Equipment, 1923-24 Volume*

of La France Co.; fitted with double-reduction instead of worm-gear axle, although worm drive can be used without material change.

Six-Wheeler. New British Six-Wheeler Has Separate Suspension for Rear End. Automotive Industries, vol. 49, no. 24, Dec. 13, 1923, pp. 1209–1210, 4 figs. Details of new flexible six-wheeler or semi-trailer which has been under test on British roads by its makers, the Asso. Equipment Co.; brake equipment includes hand, foot and air-actuated shoes; has engine of 65 hp. and is designed to average 12 mi. per hr. with 10-ton load.

Wheelless. A Wheelless Motor-Car, Alfred Gradenwitz. Sci. Am., vol. 129, no. 6, Dec. 1923, p. 381, 1 fig. Describes vehicle of wheelless type invented by R. Venzlaff of Berlin, comprising two pairs of runners 3 m. long which, like the four feet of a horse, are alternately raised and lowered, runners of each pair being rigidly connected with one another; vehicle crosses ditches with ease and will readily negotiate considerable gradients; crude-oil engines can largely be used, thus reducing working expenses.

O

OIL ENGINES

Allis-Chalmers. Operation and Care of the Allis-Chalmers Oil Engine. Southern Engr., vol. 40, nos. 3 and 4, Nov. and Dec. 1923, pp. 35–38 and 45–48, 9 figs. Engine operates on four-stroke-cycle Diesel system. Pointers on starting and shutting down, operation, care of main bearings, shaftings, crank and piston pin adjustment, distribution of load to cylinders, handling air-injection valve, and care of fuel-oil pumps and of main inlet and exhaust valve.

Cold-Starting Heavy-Oil. An Innovation in Textile Mill Driving. Power Engr., vol. 18, no. 213, Dec. 1923, pp. 460–463, 6 figs. Describes Imperial-Keighley cold-starting heavy-oil engine and its advantages as prime mover in textile mill.

High-Compression. High Compression Oil Engines in Theory and Practice. Power Engr., vol. 18, nos. 212 and 213, Nov. and Dec. 1923, pp. 411–413 and 445–447, 8 figs. Various points of importance in connection with this type of engine. Nov.: Moderate-capacity engines. Dec.: Mechanical parts are discussed severally and together.

Manufacture. A Modern Oil Engine Works. Eng. Production, vol. 6, nos. 134 and 135, Nov. and Dec. 1923, pp. 457–463 and 491–494, 26 figs. Describes plant and methods of Petters, Ltd., at Yeovil, Somerset, Eng., manufacturing engines embodying a two-stroke cycle operating on semi-Diesel principle.

Scott-Still. The Scott-Still Marine Oil Engine. Engineer, vol. 136, nos. 3543 and 3544, Nov. 23 and 30, 1923, pp. 556–558 and 592–594, 14 figs. Design and performance of first commercial Scott-Still marine engines to be completed and tested; to be installed in motorship Dolius. See also Engineering, vol. 116, no. 3021, Nov. 23, 1923, pp. 639–640, 12 figs.

Various Oil Engine Trials and Experiments, A. I. Nicholson. Motorship, vol. 8, no. 12, Dec. 1923, pp. 866–871, 10 figs. Résumé of trials carried out on Scott-Still combination oil and steam engine. (Abstract.) Paper read before Instn. Engrs. & Shipbldrs. in Scotland.

OIL FUEL

Atomization. Mechanical Atomization of Fuel Oil, Claude C. Brown. Power Plant Eng., vol. 27, nos. 22, 23 and 24, Nov. 15, Dec. 1 and 15, 1923, pp. 1130–1132, 1192–1194 and 1238–1241, 5 figs. Nov. 15: Methods of atomization; types of atomizers. Dec. 1: Factors involved in correct operation of mechanical atomizer type of oil burner. Dec. 15: Care and inspection of burners; relation of efficiency to capacity; draft requirements.

Burners. What the Oil Burner and the Oil Industries Can Do for Each Other and for the Public, G. I. Sweney. Am. Petroleum Inst.—advance paper, for meeting Dec. 11–13, 1923, 6 pp. Problems for domestic heating, etc. See also paper by F. P. Bailey for same meeting, 5 pp.

Burning. The Correct Versus the Incorrect Method of Using Fuel Oil, H. A. Anderson. Southern & Southwestern Ry. Club, vol. 17, no. 5, Sept. 1923, pp. 14, 17–18, 21–22, 25 and (discussion) 25–26, 29–30 and 33. Discusses burners, furnaces, and methods of feeding liquid fuel to burners; examples showing big saving that can be effected by using modern scientific oil-burning equipment.

Locomotives. The Burning of Fuel Oil in Railroad Locomotives, J. M. Johnston. Am. Petroleum Inst.—advance paper, for meeting Dec. 11–13, 1923, 13 pp. Includes list of important roads using fuel oil; locomotive fuel and Mexican oil; dependability of supply; advantages of burning oil vs. coal; cost of coal and oil at source; cost of transportation—coal and oil; cost of handling, and other costs.

Solid Fuels, Production from. Coal and the Problem of Liquid Fuels (La houille et le problème des combustibles liquides), E. Audibert. Chimie & Industrie, vol. 10, no. 4, Oct. 1923, pp. 613–631, 6 figs. Synthetic production of liquid fuels from solid fuels.

OXY-ACETYLENE WELDING

Aluminum. Welding Aluminum. Sheet Metal Worker, vol. 14, no. 22, Nov. 23, 1923, pp. 827–828. Difficulties to be overcome; fluxes to be used; explains preparations for work and welding operation.

Cast Iron. Accurate Cutting on Cast Iron. Welding Engr., vol. 8, no. 11, Nov. 1923, pp. 19–22, 9 figs. Describes cuts made by oxy-acetylene torch on cast-iron s of a seven-story building, in order to move it.

Coal Driers. Huge Coal Dryer Oxy-Acetylene Welded, T. C. Fetherston. Am. Welding Soc.—Jl., vol. 2, no. 11, Nov. 1923, pp. 25–28, 4 figs. Describes oxy-acetylene welding as carried out in connection with construction of a coal drier at a plant in southeastern Pennsylvania, for joining steel plates which compose outer shell and internal flue and attaching circular head permanently fitted in one end.

Metal Appliances. Oxy-Acetylene Welding of Metal Appliances. Sheet Metal Worker, vol. 14, no. 23, Dec. 7, 1923, pp. 866–867, 4 figs. Application of this type of welding in making tanks, stills and the like.

P

PAINTS

Lithopone. United States Government Specification for Gloss Interior Lithopone Paint, White and Light Tints. U. S. Bur. Standards, Federal Specifications Board, Standard Specification No. 67, Sept. 19, 1923, 8 pp. Specification officially adopted by Federal Specifications Board on Sept. 1, 1923, for use of Departments and Independent Establishments of Government in purchase of this paint, covering sampling, laboratory examination, analysis of pigment, and reagents.

PATTERNMAKING

Gears. Pattern Making on Helical or Herring-bone Gear, Joseph Caslin. Can. Foundryman, vol. 14, no. 11, Nov. 1923, pp. 25 and 34, 1 fig. Purpose of this type of gear; laying out and locating teeth; necessity of each tooth being a segment of a perfect screw; stripping plate recommended.

PISTON RINGS

Compound. A New Compound Piston Ring. English Mechanics, vol. 118, no. 3058, Nov. 2, 1923, p. 197, 1 fig. Account of Whidbourne ring, an original type which combines uniformity of wall pressure with gas-tightness even after much wear.

Design and Practice. Modern Piston Ring Practice Involves Efficient Design and Production, P. M. Heldt. Automotive Industries, vol. 49, nos. 23 and 24, Dec. 6 and 13, 1923, pp. 1142–1146, 6 figs., and 1204–1208, 5 figs. Reviews development of modern pistonring practice and gives constructive ideas about relative efficiency of various design features.

PLANERS

Switch. New Switch Planer. Iron Age, vol. 112, no. 22, Nov. 29, 1923, pp. 1143–1144, 3 figs. Machine for production work on heavy switches; massive construction and convenient control.

POWER

Combined Purchased and Generated. The Combined Use of Self-Generated and Purchased Power with Simultaneous Waste-Heat Consumption (Ueber das Zusammenwirken von Eigenkrafterzeugung und Fremdstrombezug bei gleichzeitigem Abwärmebedarf), M. Hirsch. Wärme, vol. 44, no. 43, Oct. 26, 1923, pp. 469–471, 5 figs. Power and heat conditions in leather factory using its own and purchased power; use of sufficient purchased current to insure a maximum utilization of exhaust steam, with and without waste-heat storage.

POWER PLANTS

Economy. Power Plant Management, Robert June. Elec. Light & Power, vol. 1, nos. 8, 9, 10 and 12, Aug., Sept., Oct. and Dec. 1923, pp. 37–39 and 43–44; 22–24, 54 and 64; 31–32, 68–71 and 75; and 52, 71–72 and 78, 16 figs. Classification of coals; comparison of different ranks; moisture in coal; ash; influence of size on boiler efficiency; combustion space required for various coals; purchasing pointers; chemistry of combustion; air required for combustion; combustion losses; heat balance; draft for different fuels; control of draft, etc.

Equipment, Power Show, New York. Second Power Show Opens. Power, vol. 58, no. 23, Dec. 4, 1923, pp. 904–909. Details and list of exhibits.

Problems. Power Plant Problems as Viewed by Designers, Operators and Manufacturers. Power, vol. 58, no. 23, Dec. 4, 1923, pp. 881–882. Discussion of problems confronting power-plant field by designers, operators and manufacturers; dealing with shortcomings and apparent difficulties of existing methods, machinery and material.

PRESSES

Hydraulic. What Can Be Done with High Pressures in the Chemical Engineering Industries, Chas. L. Mantell. Chem. & Met. Eng., vol. 29, no. 23, Dec. 3, 1923, pp. 1015–1018, 10 figs. How hydraulic press solves difficult production problems in mechanical separation of liquids and solids.

PRODUCER GAS

Study of. Producer-Gas and Gas-Producer Practice, R. V. Wheeler. Fuel in Sci. & Practice, vol. 2, nos. 1, 2, 3, 4, 5, 6, 7, 8, 9, 10 and 11, Jan.-Feb., Mar., Apr., May, June, July, Aug., Sept., Oct., Nov. and Dec. 1923, pp. 15–21, 48–53, 72–77, 106–110, 156–160, 219–221, 269–272, 293–296, 334–338 and 369–372, 41 figs. Definition of producer gas and gas producer; chemical reactions taking place within producer; action of air upon carbon; action of carbon dioxide and of steam upon carbon; relative rates of reactions within gas producer; ash, combustion, reaction and distillation zones within producer; temperature distribution; producer construction, and types of producers; slagging gas producers; composition of producer gas; producer gas as a furnace fuel; value of different combustible gases as fuel; efficiency of gas-producing plant; "gross" and "net" calorific values; radiation and other losses; choice of fuel.

PSYCHOLOGICAL TESTS

Vocational Men and Regular Students. The Performance of Vocational Men and Regular Students on Three Types of Psychological Test, John A. McGeoch. Wash. Univ. Studies, vol. 10, no. 2, Jan. 1923, pp. 67–85. Results of comparison show that, although scores on tests are uniformly higher for regular students, those of vocational men fall well within limits of normal performance on all tests. Bibliography.

PULVERIZED COAL

Boiler Firing. Boiler Firing with Pulverized Coal at the Bruay Central Station [Chauffage des chaudières au charbon pulverisé (Centrale électrique de Bruay)], M. Sohm. Revue de l'Industrie Minérale, no. 68, Oct. 15, 1923, pp. 561–586, 15 figs. Degree of inflammability of pulverized fuel in hoppers; cost of steam per ton; flexibility of vaporization; amount and nature of ash collected; etc.

Pulverized Fuel. Eng. & Boiler House Rev., vol. 37, no. 4, Oct.-Nov. 1923, pp. 96 and 98, 1 fig. Brief description of huge installation being erected at Vitry power station in Paris, as illustrating remarkable developments in pulverized-fuel firing made in United States during past two or three years.

Fineness Testing. Determination of the Finenes of Powdered Coal, W. A. Selvig and W. L. Parker. U. S. Bur. of Mines—Reports of Investigations, no. 2545, Nov. 1923, 14 pp. Results of sieving tests on two standard samples of pulverized coal; as result method for making fineness tests, by hand sieving, is recommended as standard method, while rapid method, by machine sieving, is given for routine tests.

Power Plants. Notes on Pulverised Coal as a Fuel in Practice, A. E. Val Davies. S. A. Inst. Elec. Engrs.—Trans., vol. 14, part 9, Sept. 1923, pp. 162–170 and (discussion) 170–172. Résumé of present position of pulverized-coal and power-supply industry; notes on coal driers, milling or grinding; conveying and feeding; present developments.

Turbo-Pulverizer. Development in Powdered Fuel Firing, J. S. Atkinson. Elec. Times, vol. 64, no. 1673, Nov. 8, 1923, pp. 475–477, 8 figs. Contrasts turbo-pulverizer unit with central system, and replies to criticisms of pulverized-fuel firing.

PUMPING

Pneumatic. Pneumatic Pumping Up to Date, John Oliphant. Am. Water Works Assn.—Jl., vol. 10, no. 6, Nov. 1923, pp. 1082–1087, 3 figs. Experience of several years' work in pumping water from wells with compressed air.

PUMPS

Mine, Metals for. Metals Must Resist Corrosion, G. A. Drysdale. Foundry, vol. 51, no. 23, Dec. 1, 1923, pp. 952–954. Points out that pumps in mines handling acidified waters require special metals; alloys should be free from zinc; tests under working conditions give different results from those made in laboratory.

Priming, Interceptor for. The Seaborne "Interceptor" for the Priming of Pumps, C. J. H. Penning. Int. Sugar Jl., vol. 25, no. 299, Nov. 1923, pp. 584–586, 5 figs. Particulars of Seaborne "interceptor," which provides means whereby a centrifugal or rotary pump is kept permanently primed, while there are no restricted passages in suction main, no fine adjustments, and no valves; is a receptable placed in suction pipe line just above pump housing.

PUMPS, CENTRIFUGAL

Pump and Paper Stock Handling. Centrifugal Pumps for Handling Pump and Paper Stocks at Various Consistencies, R. W. Pryor, Jr. Paper Trade Jl., vol. 77, no. 22, Nov. 29, 1923, pp. 43–45, 4 figs. Discusses essentials of a satisfactory pump to serve a papermaker, viz., dependability, accessibility, efficiency and interchangeability; description of Buffalo pump.

PUNCHING MACHINES

Table for. A One-man Punching Table. Engineer, vol. 136, no. 3542, Nov. 16, 1923, p. 539, 3 figs. Describes new British type of punching table which, it is claimed, possesses all advantages of one-man punching machine, and is capable of being adapted to any existing punch.

PYROMETERS

Optical and Radiation. Optical and Radiation Pyrometry, R. S. Whipple. Birmingham Met. Soc.—Jl., vol. 8, no. 8, 1923, pp. 360–378 and (discussion) 378–381, 8 figs. Deals with types of pyrometers which have proved suitable for industrial use.

Smoked Glasses, Use in Measurements. The Use of Smoked Glasses in Optical-Pyrometrical Measurements (Ueber den Gebrauch von Rauchgläsern bei optisch-pyrometrischen Messungen), Fr. Hoffmann. Zeit. für Physik, vol. 17, no. 1, July 30, 1923, pp. 1–2, 6 figs. It is shown how pyrometrical weakening of smoked glasses when used on Holborn-Kurlbaum pyrometers can be calculated from spectral permeability of the smoked glass and the ocular filter employed, when light shining through pyrometer is no longer monochromatic.

R

RAILWAY ELECTRIFICATION

Economics. Some Aspects of Railway Electrification, E. Marshall. West. Soc. Engrs.—Jl., vol. 28, no. 11, Nov. 1923, pp. 485–488 and (discussion) 488–490. Author raises question as to why railroads have not

Manufactured by Advertisers — CLASSIFIED LIST OF MECHANICAL EQUIPMENT — Alphabetical List on page 140

Steel, Alloy
Cann & Saul Steel Co.
Union Drawn Steel Co.

Steel, Bar
Cann & Saul Steel Co.

Steel, Bright Finished
Union Drawn Steel Co.

Steel, Cold Drawn
Union Drawn Steel Co.

Steel, Cold Rolled
Cumberland Steel Co
Union Drawn Steel Co.

Steel, Nickel
Union Drawn Steel Co.

Steel, Open-Hearth
* Falk Corporation
Union Drawn Steel Co.

Steel Plate Construction
* Bigelow Co.
* Brownell Co.
* Burhorn, Edwin Co.
* Casey-Hedges Co.
* Cole, R. D. Mfg. Co.
* Graver Corp'n
* Hendrick Mfg. Co.
* Keeler, E. Co.
Morrison Boiler Co.
Steere Engineering Co.
* Titusville Iron Works Co.
* Union Iron Works
* Vogt, Henry Machine Co.
* Walsh & Weidner Boiler Co.

Steel, Rock Drill
* Ingersoll-Rand Co.

Steel, Screw, Cold Drawn
Union Drawn Steel Co.

Steel, Strip (Cold Rolled)
Driver-Harris Co.

Steel, Tool
Cann & Saul Steel Co.

Steel, Vanadium
Union Drawn Steel Co.

Steps, Ladder & Stair (Non-Slipping)
* Irving Iron Works Co.

Stills
* Vogt, Henry Machine Co.

Stocks and Dies
* Curtis & Curtis Co.
* Landis Machine Co. (Inc.)

Stokers, Chain Grate
* Babcock & Wilcox Co.
* Combustion Engineering Corp'n
* Westinghouse Electric & Mfg. Co.

Stokers, Overfeed
* Detroit Stoker Co.
* Riley, Sanford Stoker Co.
* Westinghouse Electric & Mfg. Co.

Stokers, Underfeed
* American Engineering Co.
* Combustion Engineering Corp'n
* Detroit Stoker Co.
* Riley, Sanford Stoker Co.
* Sturtevant, B. F. Co.
* Westinghouse Electric & Mfg. Co.

Stools and Chairs, Metal
Manufacturing Equip. & Engrg. Co.

Strainers, Oil
* Bowser, S. F. & Co. (Inc.)

Strainers, Steam
* Foster Engineering Co.
* Kieley & Mueller (Inc.)

Strainers, Water
Elliott Co.
* Foster Engineering Co.
* Kieley & Mueller (Inc.)
* Schutte & Koerting Co.

Strainers, Water (Traveling)
Link-Belt Co.

Structural Steel Work
* Hendrick Mfg. Co.
* Walsh & Weidner Boiler Co.

Sugar Machinery
Farrel Foundry & Machine Co.
* Walsh & Weidner Boiler Co.

Superheaters, Steam
* Babcock & Wilcox Co.
* Power Specialty Co.
* Superheater Co.

Superheaters, Steam (Locomotive)
* Power Specialty Co.
* Superheater Co.

Superheaters, Steam (Marine)
* Power Specialty Co.
* Superheater Co.

Switchboards
* General Electric Co.
* Westinghouse Electric & Mfg. Co.

Switches, Electric
* General Electric Co.
* Westinghouse Electric & Mfg. Co.

Synchronous Converters
(See Converters, Synchronous)

Synchroscopes
Weston Electrical Instrument Co.

Tables, Drawing
Dietzgen, Eugene Co.
Economy Drawing Table & Mfg. Co.
Keuffel & Esser Co.
ParVell Laboratories
Weber, F. Co. (Inc.)

Tachometers
* American Schaeffer & Budenberg Corp'n
* Bristol Co.
Veeder Mfg. Co.
Weston Electrical Instrument Co.

Tachoscopes
* American Schaeffer & Budenberg Corp'n

Tanks, Acid
* Graver Corp'n
* Walsh & Weidner Boiler Co.

Tanks, Ice
* Frick Co. (Inc.)
* Graver Corp'n

Tanks, Oil
* Graver Corp'n
* Hendrick Mfg. Co.
Morrison Boiler Co.
Nugent, Wm. W. & Co. (Inc.)
* Scaife, Wm. B. & Sons Co.
* Titusville Iron Works Co.
* Walsh & Weidner Boiler Co.

Tanks, Pressure
* Brownell Co.
* Graver Corp'n
* Hendrick Mfg. Co
Morrison Boiler Co.
* Titusville Iron Works Co.
* Vogt, Henry Machine Co.
* Walsh & Weidner Boiler Co.

Tanks, Steel
* Bigelow Co.
* Brownell Co.
* Casey-Hedges Co.
* Cole, R. D. Mfg. Co.
* Graver Corp'n
* Hendrick Mfg. Co.
Morrison Boiler Co.
* Scaife, Wm. B. & Sons Co.
* Titusville Iron Works Co.
* Union Iron Works
* Vogt, Henry Machine Co.
* Walsh & Weidner Boiler Co.

Tanks, Storage
* Brownell Co.
* Cole, R. D. Mfg. Co.
* Combustion Engineering Corp'n
* Graver Corp'n
* H. S. B. W.-Cochrane Corp'n
* Hendrick Mfg. Co.
Herbert Boiler Co.
Morrison Boiler Co.
Nugent, Wm. W. & Co. (Inc.)
* Scaife, Wm. B. & Sons Co.
* Titusville Iron Works Co.
* Vogt, Henry Machine Co.
* Walsh & Weidner Boiler Co.

Tanks, Tower
* Graver Corp'n
* Walsh & Weidner Boiler Co.

Tanks, Welded
* Cole, R. D. Mfg. Co.
* Graver Corp'n
Morrison Boiler Co.
* Scaife, Wm. B. & Sons Co.

Tap Extensions
Allen Mfg. Co.

Tapping Attachments
* Whitney Mfg. Co.

Temperature Regulators
(See Regulators, Temperature)

Testing Laboratories, Cement
* Smidth, F. L. & Co.

Textile Machinery
* Franklin Machine Co.

Thermometers
* American Schaeffer & Budenberg Corp'n
* Ashton Valve Co.
* Bristol Co.
* Sarco Co. (Inc.)
* Tagliabue, C. J. Mfg. Co.
* Taylor Instrument Cos.

Thermometers, Chemical
* Tagliabue, C. J. Mfg. Co.

Thermometers, Distance
* Taylor Instrument Cos.

Thermometers, High Range (Recording)
* Bailey Meter Co.
* Tagliabue, C. J. Mfg. Co.
* Taylor Instrument Cos.

Thermometers, Industrial
* Tagliabue, C. J. Mfg. Co.

Thermostats
* Bristol Co.
* Fulton Co.
* General Electric Co.
Wilson, H. A. Co.

Thread Cutting Tools
* Crane Co.
* Jones & Lamson Machine Co.
* Landis Machine Co. (Inc.)

Threading Machines, Pipe
* Landis Machine Co. (Inc.)

Tie Tamping Outfits
* Ingersoll-Rand Co.

Time Recorders
* Bristol Co.

Tinsmiths' Tools and Machines
* Niagara Machine & Tool Works

Tipples, Steel
Link-Belt Co.

Tobacco Machinery
* American Machine & Foundry Co.

Tongs, Crane
* Kenworthy, Chas. F. (Inc.)

Tools, Brass-Working Machine
* Warner & Swasey Co.

Tools, Machinists' Small
* Atlas Ball Co.

Tools, Pneumatic
* Ingersoll-Rand Co.

Tools, Special
DuPont Engineering Co.

Tracks, Industrial Railway
Easton Car & Construction Co.
Northern Engineering Works

Tractors
* Allis-Chalmers Mfg. Co.

Tractors, Industrial (Storage Battery)
* Yale & Towne Mfg. Co.

Tractors, Turntable
* Whiting Corp'n

Trailers, Industrial
* Yale & Towne Mfg. Co.

Tramrail Systems, Overhead
* Brown Hoisting Machinery Co.
Link-Belt Co.
Northern Engineering Wks.
Reading Chain & Block Corp'n
* Whiting Corp'n

Tramways, Bridge
Link-Belt Co.

Tramways, Wire Rope
Clyde Iron Works Sales Co.
Lidgerwood Mfg. Co.
* Roebling's, John A. Sons Co.

Transfer Tables
* Whiting Corp'n

Transformers, Electric
* Allis-Chalmers Mfg. Co.
* General Electric Co.
* Westinghouse Electric & Mfg. Co.

Transmission Machinery
(See Power Transmission Machinery)

Transmissions, Automobile
* Foote Bros. Gear & Machine Co.

Transmissions, Variable Speed
* American Fluid Motors Co.

Traps, Radiator
* American Radiator Co.
* Sarco Co. (Inc.)

Traps, Return
* American Blower Co.
* Crane Co.
* Kieley & Mueller (Inc.)

Traps, Steam
* American Blower Co.
* American Schaeffer & Budenberg Corp'n
* Crane Co.
* Davis, G. M. Regulator Co.
Elliott Co.
* Jenkins Bros.
Johns-Manville (Inc.)
* Kieley & Mueller (Inc.)
* Reading Steel Casting Co. (Inc.)
(Pratt & Cady Division)
* Sarco Co. (Inc.)
* Schutte & Koerting Co.
Squires, C. E. Co.
* Vogt, Henry Machine Co.

Traps, Vacuum
* American Blower Co.
* American Schaeffer & Budenberg Corp'n
* Crane Co.
* Sarco Co. (Inc.)

Treads
* Irving Iron Works Co.

Treads, Stair (Rubber)
* United States Rubber Co.

Trolleys
* Brown Hoisting Machinery Co.
Reading Chain & Block Corp'n
* Whiting Corp'n

Trucks, Industrial (Storage Battery)
* Yale & Towne Mfg. Co.

Trucks, Trailer
* Yale & Towne Mfg. Co.

Tubes, Boiler, Seamless Steel
* Casey-Hedges Co.

Tubes, Condenser
* Scovill Mfg. Co.
* Wheeler Condenser & Engrg. Co.

Tubes, Pitot
Bacharach Industrial Instrument Co.

Tubing, Rubber
* Goodrich, B. F. Rubber Co
* United States Rubber Co.

Tubing, Rubber (Hard)
* Goodrich, B. F. Rubber Co.

Tumbling Barrels
Farrel Foundry & Machine Co.
Northern Engineering Works
* Royersford Fdry. & Mach. Co.
* Whiting Corp'n

Turbines, Hydraulic
* Allis-Chalmers Mfg. Co.
* Cramp, Wm. & Sons Ship & Engine Bldg. Co.
Hoppes Water Wheel Co.
* Leffel, James & Co.
Newport News Shipbuilding & Dry Dock Co.
Smith, S. Morgan Co.
* Worthington Pump & Mchry. Corp'n

Turbines, Steam
* Allis-Chalmers Mfg. Co.
* De Laval Steam Turbine Co.
* General Electric Co.
* Kerr Turbine Co.
Ridgway Dynamo & Engine Co.
* Sturtevant, B. F. Co.
* Terry Steam Turbine Co.
* Westinghouse Elec. & Mfg. Co.

Turbo-Blowers
* General Electric Co.
* Ingersoll-Rand Co.
* Kerr Turbine Co.
* Sturtevant, B. F. Co.

Turbo-Compressors
* Ingersoll-Rand Co.

Turbo-Generators
* Allis-Chalmers Mfg. Co.
* De Laval Steam Turbine Co.
* General Electric Co.
* Kerr Turbine Co.
Ridgway Dynamo & Engine Co.
* Sturtevant, B. F. Co.
* Terry Steam Turbine Co.
* Westinghouse Electric & Mfg. Co.

Turbo-Pumps
* Coppus Engineering Corp'n
* Kerr Turbine Co.
* Terry Steam Turbine Co.
* Wheeler Condenser & Engineering Co.

Turntables
Easton Car & Construction Co.
Link-Belt Co.
Northern Engineering Works
* Whiting Corp'n

Turret Machines
(See Lathes, Turret)

Unions
* Crane Co.
* Edward Valve & Mfg. Co.
Lunkenheimer Co.
* Pittsburgh Valve, Fdry. & Const. Co.
* Vogt, Henry Machine Co.

Unloaders, Air Compressor
* Ingersoll-Rand Co.
* Worthington Pump & Machinery Corp'n

Unloaders, Ballast
Lidgerwood Mfg. Co.

Unloaders, Car
* Gifford-Wood Co.
Link-Belt Co.

Vacuum Breakers
* Foster Engineering Co.

Vacuum Dryers, Pans, Pumps, Traps, etc.
(See Pans, Pumps, Traps, etc., Vacuum)

*Catalogue data of firms marked * appear in the A.S.M.E. Condensed Catalogues of Mechanical Equipment, 1923-24 Volume*

further extended electrification of those projects that have been successful in past; discusses economics of question.

Europe. The Electrification of Foreign Railways, S. Parker Smith. Beama, vol. 13, nos. 63, 65 and 67, July, Sept. and Nov. 1923, pp. 20–29, 158–166 and 298–303, 7 figs. July: Switzerland: use of direct-current, 3-phase and single-phase systems. Sept. Italy: d.c. and 3-phase systems; locomotives; results. Nov.: Scandinavian countries.

France. Electrification of the Midi Railway (Note sur l'Electrification des Chemins de Fer du Midi), P. Leboucher and H. Ledoux. Revue Générale des Chemins de Fer, vol. 42 (1st Half), nos. 3, 5, 6 and vol. 42 (2d Half), nos. 1 and 2, Mar., May, June, July and Aug. 1923, pp. 181–225, 373–386, 461–481, 3–14 and 61–79. 106 figs. Program of electrification; power stations; high-tension lines, insulators, poles, protection against excess voltage, etc.; substations; electric locomotives; etc.

Electrification of the Midi Railway. Ry. Gaz. vol. 39, no. 22, Nov. 30, 1923, pp. 695–696. Summary of paper read to French Soc. Civ. Engrs., British Section, Nov. 22, 1923, by A. Pachellery, describing electrification work now in progress.

First Stage of the Program of Partial Electrification of the Paris, Lyons and Mediterranean System (Note sur la première étape du programme d'électrification partielle du réseau P. L. M.), M. Japiot. Revue Générale des Chemins de Fer, vol. 42, no. 5, Nov. 1923, pp. 291–321, 15 figs. Details regarding electrification of line from Culoz to Modane, and lines in vicinity of Nice.

Systems and Methods. Systems and Methods of Railway Electrification, H. M. Sayers. Elec. Times, vol. 44, no. 1674, Nov. 15, 1923, pp. 507–509, 4 figs. Discusses problems of electrification, with special regard to British conditions.

RAILWAY EQUIP MENT

Tools for Maintenance. Tool Equipment for Bridge, Building and Water Service. Ry. Eng. & Maintenance, vol. 19, no. 12, Dec. 1923, pp. 495–497, 2 figs. Comprehensive lists of devices and appliances used by railway maintenance forces.

RAILWAY MANAGEMENT

Stores and Mechanical Departments, Coöperation. Relation of Stores and Mechanical Departments, F. M. A'Hearn. Ry. Mech. Engr., vol. 97, no. 12, Dec. 1923, pp. 834–838, 9 figs. Describes practice of Bessemer & Lake Erie, Greenville, Pa., in handling certain stocks of material; method of handling firebox renewals; system for delivering material; disposal of scrap material.

RAILWAY MOTOR CARS

Diesel-Electric. Ten Years' Diesel-Electric Railroad Experience, Thos. Orchard Lisle. Oil Engine Power, vol. 1, no. 11, Nov. 1923, pp. 529–537, 11 figs. Details of what has been done in Sweden on adoption of Diesel-electric cars for branch lines, since first car was put into operation ten years ago; 20 units of various sizes, from 75 hp. to 250 hp., now in service; advantages of Diesel-electric system; cost data.

Drewry. Silent Chain Final Drive is Used on Drewry Railcars, M. W. Bourdon. Automotive Industries, vol. 49, no. 23, Dec. 6, 1923, pp. 1152–1154, 2 figs. 4- and 6-cylinder engines are of more rugged construction than those generally employed in truck service; gearset has two parts of constant mesh gears; controls duplicated at each end.

Gasoline. Gasoline Motor Train for the Mississippi Central Ry. Ry. Rev., vol. 73, no. 21, Nov. 24, 1923, pp. 761–763, 7 figs. Rail motor car and trailer which is to be operated at two-unit train in branch-line service.

Gasoline Railway Motor Cars [Automotrices à moteur thermique (explosion ou combustion interne)]. Industrie des Tramways, vol. 17, no. 202, Oct. 1923, pp. 395–402, 7 figs. Particulars of tests of Berliet and Renault-Scemia cars.

Renault. The New Renault-Scemia Railway Motor Car (La nouvelle automotrice Renault-Scemia). Génie Civil, vol. 83, no. 15, Oct. 13, 1923, pp. 337–340, 8 figs. Details of new type with capacity for 40 passengers which has been submitted to series of tests with successful results; can be adapted to standard and narrow-gage roads.

Steam. Steam Motor Coach on the Jersey Railways. Tramway & Ry. Jl., vol. 54, no. 24, Nov. 15, 1923, pp. 260–262, 5 figs. Design and operating data of car on system of Jersey Railways & Tramways, Ltd.; runs a distance of four miles with six intermediate stops, with a scheduled timing for the single journey of 15 min.

Two-Car Trains. Two-Car Motor Train for Mississippi Central. Ry. Mech. Engr., vol. 97, no. 12, Dec. 1923, pp. 830–832, 7 figs. Chassis, of 4-wheel-drive type, and trailer provide baggage space and seats for 46 passengers.

RAILWAY OPERATION

Fuel Economy. Fundamentals of Fuel Economy, W. L. Richards. Ry. Age, vol. 75, no. 22, Dec. 1, 1923, pp. 999–1003. Discusses the three elements entering into economical use of fuel, viz., operation, mechanical factors, and personnel.

Train Despatching. Recent Developments in Telephone Equipment for Train Dispatching Circuits, Wm. H. Capen. Elec. Communication, vol. 2, no. 2, Oct. 1923, pp. 111–140, 22 figs. Outline of history up to present time; transmission requirements of despatching circuits as compared to those of ordinary telephone circuits; effect of electrical characteristics of line, number of sets, etc., on proper design for maximum efficiency; "standing waves;" diagrams of circuits for despatcher's and waystation sets; development of vacuum-tube amplifier with loud speaker for despatcher and way-station use; practical application and limitations of present train despatching apparatus; appendix giving development of mathematical formulas used in design of apparatus. From paper read at Am. Ry. Assn. convention.

RAILWAY SHOPS

Locomotive. Shop Reorganisation at Swindon Works. Great Western Railway. Ry. Gaz., vol. 39, no. 22, Nov. 30, 1923, pp. 685–692, 14 figs. Improvement in methods and greater expedition in completing work effected at locomotive works, by regrouping certain appliances and thereby centralizing specified operations, together with introduction of new machine tools.

RAILWAY TRACK

Track Laying. Laying a Mile of Rail Per Hour Under Traffic. Ry. Age, vol. 75, no. 23, Dec. 8, 1923, pp. 1047–1050, 9 figs. Methods employed by Can. Pacific in laying over 100 mi. of 100-lb. rail under traffic; laid in units of two rails by double tong gangs consistently at rate of 20 to 21 sec. per rail.

REAMERS

Taper. Piloted Machine Taper Reamers, Frederic Cooke. Machy. (Lond.), vol. 23, nos. 579 and 581, Nov. 1 and 15, 1923, pp. 139–142, and 202–204, 6 figs. Reamers are divided into their three main parts, namely, pilot, tooth, and shank, each of which is considered separately.

REFRACTORIES

Steel Industry. Refractories in the Steel Industry, J. Spotts McDowell. Blast Furnace & Steel Plant, vol. 11, nos. 10 and 11, Oct. and Nov. 1923, pp. 525–529 and 569–574, 10 figs. Clay, silica, firebrick, high-alumina and magnesite refractories; properties.

REFRIGERATING MACHINES

Lubrication. Lubrication of Refrigeration Machinery. Lubrication, vol. 9, no. 10, Oct. 1923, pp. 109–120, 20 figs. Discusses operating conditions of ammonia, carbonic anhydride and other refrigerants, as they involve lubrication.

REFRIGERATING PLANTS

Ammonia Compressors. Compression Curves for Ammonia Compressors, Wm. D. Jack. Ice & Refrigeration, vol. 65, nos. 1, 2, 3, 4 and 5, July, Aug., Sept., Oct. and Nov. 1923, pp. 17–19, 79–81, 135–137, 198–200 and 262–264, 2 figs. Adiabatic, isothermal, saturation, and saturated-compression curves for ammonia machine; thermodynamic formulas; fundamental constants and relationships; mean effective pressure formulas.

Ammonia Condensers. Performance Tests on a Flooded Atmospheric Type Ammonia Condenser, H. J. Macintire and Earl Beling. Refrig. Eng., vol. 10, no. 3, Sept. 1923, pp. 87–90 and (discussion) 90–91 and 93, 8 figs. Results of tests carried out to find out action of ammonia in a flooded condenser, coefficient of heat transfer and function of condensing water.

Tests. Testing an Ammonia Refrigerating Plant, Chas. H. Herter. Power, vol. 58, no. 22, Nov. 27, 1923, pp. 846–849, 2 figs. Running of tests; evaporating system; condenser records; computed efficiencies; observations and deductions from tests made on 125-ton plant.

REFRIGERATION

Gas, Cooling with. Producing Cold with Gas, H. DeWitt Valentine. Am. Gas Jl., vol. 119, no. 28, Dec. 15, 1923, pp. 629–631 and 642–644, 4 figs. How gas is used in refrigeration. Read before Am. Gas Assn.

RESEARCH

Scientific, Relation to Industry. Science and Industry in America, Walter Rosenhain. Engineer, vol. 136, nos. 3533, 3534, 3535, 3536, 3537, 3538, 3539, 3540, 3541 and 3542, Sept. 14, 21, 28, Oct. 5, 12, 19, 26, Nov. 2, 9 and 16, 1923, pp. 270–271; 298–299, 5 figs.; 330–331, 1 fig.; 358–359; 384–385; 412–413; 440–441; 468–469; 494–496, 5 figs.; and 522–524, 3 figs. Discusses attitude of industry toward scientific research and of scientific investigators towards industry. Applications of science and scientific methods in some typical industrial and governmental establishments and work done in this connection in some American colleges and universities.

ROLLING MILLS

Continuous. Rolling Mill Practice, T. Price. Metal Industry (Lond.), vol. 23, nos. 22 and 23, Nov. 30 and Dec. 7, 1923, pp. 493–494 and 516–518. Details and advantages of Morgan continuous mill, which combines Acme and Morgan skelp mills; action and design of rolls. Paper read before Staffordshire Iron & Steel Inst.

Plate. Scotch Build a New Plate Mill, Jos. Horton. Iron Trade Rev., vol. 73, no. 21, Nov. 22, 1923, pp., 1421–1426, 9 figs. New mill at plant of Dav. Colville & Sons, Glasgow, has capacity of 3000 tons weekly; furnaces and rolls reflect departures from conventional design.

Practice. Rolling-Mill Practice, T. Price. Iron & Coal Trades Rev., vol. 107, no. 2907, Nov. 16, 1923, pp. 727–728. Cogging and finishing mills; need for correctly designed rolls; effect of rolling on material; designing of rolls; points to watch in designing rolls; diagonal designing. (Abstract.) Paper read before Staffordshire Iron & Steel Inst.

Rod Mill. New Rod Mill for Wire and Cable Plant. Iron Age, vol. 112, no. 23, Dec. 6, 1923, pp. 1505–1507, 5 figs. Tonnage unit of combined continuous and looping type installed for rolling both steel and copper, at Kinkora plant, Roebling, N. J.

Sheet Mills. "National Enamel" Problem Demands Uninterrupted Control of Elements, F. J. Crolius. Blast Furnace & Steel Plant, vol. 11, no. 12, Dec. 1923, pp. 620–623, 7 figs. Methods and equipment of new sheet mills at Granite City, Ill.

Strip Mills. Hot Strip Capacity Is Augmented. Iron Trade Rev., vol. 73, no. 24, Dec. 13, 1923, pp. 1609–1611, 4 figs. Pittsburgh district producer completes new unit at Leechburg, Pa. which will permit scheduling of wide sizes and light gages; mill arrangement affords rolling both ways of grain; details of installation. See also Iron Age, vol. 112, no. 24, Dec. 13, 1923, pp. 1581–1583, 5 figs.

S

SAND, MOLDING

Silica Sand. Use of Silica Sand for Steel Foundry Purposes, L. Heber Cole. Cement, Mill & Quarry, vol. 23, no. 9, Nov. 5, 1923, pp. 31–32. Its bonding power, permeability, and refractoriness; silica sand for furnace linings.

SCREW THREADS

Milling. Producing Accurate Threads by Milling Process, H. P. Armson. Can. Machy., vol. 30, nos. 19, 20 and 21, Nov. 8, 15 and 22, 1923, pp. 18–21, 22 and 33, and 13–17, 8 figs. General description of principles, methods and advantages of thread milling, with data on cutter design, and recommended speeds and feeds for cutting various materials.

SEAPLANES

Seaworthiness. The Design of Marine Aircraft in Relation to Seaworthiness, D. F. Lucking. Roy. Aeronautical Soc.—Jl., vol. 27, no. 155, Nov. 1923, pp. 535–552. Describes disabilities from which various types of marine aircraft suffer in regard to seaworthiness. Bibliography.

SEMI-DIESEL ENGINES

Vickers-Petters. The Largest Vickers-Petters' Engine in Ireland. Power Engr., vol. 18, no. 212, Nov. 1923, p. 410, 1 fig. 510-b.hp. Semi-Diesel engine erected at Dundalk municipal power plant.

SHAFTS

Fits. Fits, H. P. Phillips. West. Machy. Wld., vol. 14, no. 11, Nov. 1923, pp. 357 and 362. Describes practice of Meese & Gottfried Co., San Francisco, Cal., who are called upon to bore for various classes of shaft fits from 6000 to 8000 iron castings used in transmission and conveying machinery.

SHAPERS

Automatic Bevel-Wheel. Automatic Bevel Wheel Shaping Machines. Eng. Progress, vol. 4, no. 10, Oct. 1923, pp. 216–218, 4 figs. Describes shaping machine made by Zimmermann Works and points out advantages with regard to rapid and accurate production of bevel-wheel gearings, which are obtained by using described method of shaping profiles of teeth by means of templates.

Gear Box Inside Column. New Line of Shapers. Iron Age, vol. 112, no. 22, Nov. 29, 1923, pp. 1445–1446, 4 figs. New shapers known as Climax have gear box inside of column, automatic visible lubrication, and other improved features.

Overhanging Gear Box. New Line of Shapers Meets Variety of Needs. Automotive Industries, vol. 49, no. 24, Dec. 13, 1923, pp. 1211–1212, 2 figs. Overhanging gear box eliminated in new models brought out by Cincinnati Shaper Co.; automatic, visible-type lubrication.

STANDARDIZATION

Variety vs. Extreme Variety Versus Standardization, L. A. Hawkins. Indus. Management (N. Y.), vol. 66, no. 6, Dec. 1923, pp. 327–334, 12 figs. Research at Gen. Elec. Co. and its effect on variety.

STEAM ENGINES

Corliss. Erecting a Corliss Engine, Guy Edwards. Southern Engr., vol. 40, no. 3, Nov. 1923, pp. 51–54, 18 figs. Handling flywheel, crankshaft and engine bed from car to foundation in plant; methods employed in handling stator of direct-connected units.

Steam Consumption. Steam-Consumption and Performance Tests on Reciprocating Steam Engines and Steam Turbines in 1922 (Dampfverbrauchs- und Leistungsversuche an Kolbendampfmaschinen und Dampfturbinen in Jahre 1922). Zeit. des Bayerischen Revisions-Vereins, vol. 27, nos. 18 and 19, Sept. 30 and Oct. 15, 1923, pp. 137–142 and 150–151. Results of tests shown in tables.

The Steam Consumption of Sugar Factory Engines, P. H. Parr. Int. Sugar Jl., vol. 25, no. 299, Nov. 1923, pp. 578–583. Discusses the three most common steam pressures used in sugar factories, viz., boiler pressure, pressure at engine, and back pressure; mean effective pressure in lb. per sq. in., and steam consumption in lb. per b.hp., at a normal piston speed of 350–400 ft. per min.; other figures.

STEAM METERS

Throttling-Disk. Transmission of Pressure from the Throttling Point in Steam Pipes to the Steam Meter (Uebertragung des Druckes von der Drosselstelle in Dampfrohrleitungen auf Dampfmesser), Hugo Ombeck. Wärme, vol. 46, no. 41, Oct. 12, 1923, pp. 449–450, 6 figs. Points out that in steam meters with throttling disk, proper transmission of pressure from throttling disk to measuring instrument is necessary for perfect results; shortcomings in present types of connecting links; recommends new solution through use of double container.

STEAM TURBINES

Efficiency. Behavior of Turbines with Variable Quantities of Steam with Throttle Control (Turbiners förhållande vid variabel ångtillförsel, speciellt strypreglerade), Matts Bäckström. Teknisk Tidskrift,

Manufactured by Advertisers

CLASSIFIED LIST OF MECHANICAL EQUIPMENT

Alphabetical List on page 140

Valve Discs
* Edward Valve & Mfg. Co.
* Goodrich, B. F. Rubber Co.
* Jenkins Bros.
* Reading Steel Casting Co. (Inc.) (Pratt & Cady Division)
* United States Rubber Co.

Valves, Air, Automatic
* Davis, G. M. Regulator Co.
* Fulton Co.
* Jenkins Bros.
* Simplex Valve & Meter Co.
* Smith, H. B. Co.

Valves, Air (Operating)
* Foster Engineering Co.

Valves, Air, Relief
* American Schaeffer & Budenberg Corp'n
* Foster Engineering Co.
* Fulton Co.
Lunkenheimer Co.
* Nordberg Mfg.Co.
* Schutte & Koerting Co.

Valves, Altitude
* Foster Engineering Co.
* Simplex Valve & Meter Co.

Valves, Ammonia
* American Schaeffer & Budenberg Corp'n
* Crane Co.
* De La Vergne Machine Co.
* Foster Engineering Co.
* Jenkins Bros.
Lunkenheimer Co.
* Reading Steel Casting Co. (Inc.) (Pratt & Cady Division)
* Vilter Mfg. Co.
* Vogt, Henry Machine Co.

Valves, Back Pressure
* Crane Co.
* Davis, G. M. Regulator Co.
* Edward Valve & Mfg. Co.
* Foster Engineering Co.
* H. S. B. W.-Cochrane Corp'n
* Jenkins Bros.
* Kieley & Mueller (Inc.)
* Pittsburgh Valve, Fdry. & Const. Co.
* Reading Steel Casting Co. (Inc.) (Pratt & Cady Division)
* Schutte & Koerting Co.

Valves, Balanced
* Crane Co.
* Davis, G. M. Regulator Co.
* Foster Engineering Co.
* Kieley & Mueller (Inc.)
Lunkenheimer Co.
* Nordberg Mfg. Co.
* Schutte & Koerting Co.

Valves, Blow-off
* Ashton Valve Co.
* Bowser, S. F. & Co. (Inc.)
* Crane Co.
* Crosby Steam Gage & Valve Co.
* Edward Valve & Mfg. Co.
Elliott Co.
* Jenkins Bros.
Lunkenheimer Co.
* Pittsburgh Valve, Fdry. & Const. Co.
* Reading Steel Casting Co. (Inc.) (Pratt & Cady Division)

Valves, Butterfly
* Chapman Valve Mfg. Co.
* Crane Co.
Lunkenheimer Co.
* Pittsburgh Valve, Fdry. & Const. Co.
* Schutte & Koerting Co.

Valves, Check
* American Schaeffer & Budenberg Corp'n
* Bowser, S. F. & Co. (Inc.)
* Chapman Valve Mfg. Co.
* Crane Co.
* Crosby Steam Gage & Valve Co.
* Edward Valve & Mfg. Co.
* Jenkins Bros.
Kennedy Valve Mfg. Co.
Lunkenheimer Co.
* Nordberg Mfg. Co.
* Pittsburgh Valve, Fdry. & Const. Co.
* Reading Steel Casting Co. (Inc.) (Pratt & Cady Division)
* Schutte & Koerting Co.
* Vogt, Henry Machine Co.
* Worthington Pump & Machinery Corp'n

Valves, Chronometer
* Foster Engineering Co.

Valves, Combined Back Pressure Relief
* Foster Engineering Co.

Valves, Diaphragm
* Foster Engineering Co.

Valves, Electrically Operated
* Chapman Valve Mfg. Co.
* Dean, Payne (Ltd.)
* General Electric Co.
Kennedy Valve Mfg. Co.
Lunkenheimer Co.
* Pittsburgh Valve, Fdry. & Const. Co.
* Reading Steel Casting Co. (Inc.) (Pratt & Cady Division)
* Schutte & Koerting Co.

Valves, Exhaust Relief
* Crane Co.
* Davis, G. M. Regulator Co.
* Edward Valve & Mfg. Co.
* Foster Engineering Co.
* H. S. B. W.-Cochrane Corp'n
* Jenkins Bros.
* Kieley & Mueller (Inc.)
* Pittsburgh Valve, Fdry. & Const. Co.
* Schutte & Koerting Co.
* Wheeler, C. H. Mfg. Co.
* Wheeler Cond. & Engrg. Co.

Valves, Float
* American Schaeffer & Budenberg Corp'n
* Crane Co.
* Davis, G. M. Regulator Co.
* Dean, Payne (Ltd.)
* Foster Engineering Co.
* Kieley & Mueller (Inc)
* Pittsburgh Valve, Fdry. & Const. Co.
* Schutte & Koerting Co.
* Simplex Valve & Meter Co.

Valves, Foot
* Crane Co.
* Pittsburgh Valve, Fdry. & Const. Co.
* Worthington Pump & Machinery Corp'n

Valves, Fuel Oil Shut-off
* Tagliabue, C. J. Mfg. Co.

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* Chapman Valve Mfg. Co.
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* Pittsburgh Valve, Fdry. & Const. Co.
* Reading Steel Casting Co. (Inc.) (Pratt & Cady Division)
* Schutte & Koerting Co.

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* Bowser, S. F. & Co. (Inc.)
* Crane Co.
* Crosby Steam Gage & Valve Co.
* Edward Valve & Mfg. Co.
* Jenkins Bros.
Kennedy Valve Mfg. Co.
Lunkenheimer Co.
* Pittsburgh Valve, Fdry. & Const. Co.
* Reading Steel Casting Co. (Inc.) (Pratt & Cady Division)
* Vogt, Henry Machine Co.

Valves, Hose
* Chapman Valve Mfg. Co.
* Crane Co.
* Jenkins Bros.
Kennedy Valve Mfg. Co.
Lunkenheimer Co.
* Reading Steel Casting Co. (Inc.) (Pratt & Cady Division)

Valves, Hydraulic
* Chapman Valve Mfg. Co.
* Crane Co.
* Crosby Steam Gage & Valve Co.
* Edward Valve & Mfg. Co.
Lunkenheimer Co.
* Pittsburgh Valve, Fdry. & Const. Co.
* Reading Steel Casting Co. (Inc.) (Pratt & Cady Division)
* Schutte & Koerting Co.
* Vogt, Henry Machine Co.

Valves, Hydraulic Operating
* Chapman Valve Mfg. Co.
Kennedy Valve Mfg. Co.
Lunkenheimer Co.
* Pittsburgh Valve, Fdry. & Const. Co.
* Reading Steel Casting Co. (Inc.) (Pratt & Cady Division)
* Schutte & Koerting Co.

Valves, Non-Return
* Crane Co.
* Crosby Steam Gage & Valve Co.
* Davis, G. M. Regulator Co.
* Edward Valve & Mfg. Co.
* Foster Engineering Co.
* Jenkins Bros.
* Kieley & Mueller (Inc.)
Lunkenheimer Co.
* Pittsburgh Valve, Fdry. & Const. Co.
* Reading Steel Casting Co. (Inc.) (Pratt & Cady Division)
* Schutte & Koerting Co.

Valves, Plug
* Chapman Valve Mfg. Co.
* Reading Steel Casting Co. (Inc.) (Pratt & Cady Division)

Valves, Pop Safety
* American Schaeffer & Budenberg Corp'n
* Ashton Valve Co.
* Crane Co.
* Crosby Steam Gage & Valve Co.
Lunkenheimer Co.

Valves, Pump
* Bowser, S. F. & Co. (Inc.)
* Goulds Mfg. Co.
* Jenkins Bros.
Johns-Manville (Inc.)
* Nordberg Mfg. Co.
* United States Rubber Co.

Valves, Radiator
* American Radiator Co.
* Crane Co.
* Dean, Payne (Ltd.)
* Foster Engineering Co.
* Fulton Co.
* Jenkins Bros.
Kennedy Valve Mfg. Co.
Lunkenheimer Co.
* Reading Steel Casting Co. (Inc.) (Pratt & Cady Division)

Valves, Radiator, Packless
* American Radiator Co.
* Fulton Co.

Valves, Reducing
* Davis, G. M. Regulator Co.
* Edward Valve & Mfg. Co.
Elliott Co.
* Foster Engineering Co.
* Fulton Co.
* Kieley & Mueller (Inc.)
Squires, C. E. Co.
* Tagliabue, C. J. Mfg. Co.

Valves, Regulating
* Crane Co.
* Davis, G. M. Regulator Co.
* Dean, Payne (Ltd.)
* Edward Valve & Mfg. Co.
* Foster Engineering Co.
* Fulton Co.
* Kieley & Mueller (Inc.)
Lunkenheimer Co.
* Simplex Valve & Meter Co.

Valves, Relief (Water)
* American Schaeffer & Budenberg Corp'n
* Ashton Valve Co.
* Crane Co.
* Crosby Steam Gage & Valve Co.
* Edward Valve & Mfg. Co.
* Foster Engineering Co.
Lunkenheimer Co.

Valves, Safety
* American Schaeffer & Budenberg Corp'n
* Crane Co.
* Crosby Steam Gage & Valve Co.
* Jenkins Bros.
Lunkenheimer Co.

Valves, Stop and Check
(See Valves, Non-Return)

Valves, Superheated Steam (Steel)
* Bowser, S. F. & Co. (Inc.)
* Chapman Valve Mfg. Co.
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Lunkenheimer Co.
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* Reading Steel Casting Co. (Inc.) (Reading Valve & Fittings Div.)
* Schutte & Koerting Co.
* Vogt, Henry Machine Co.

Valves, Thermostatically Operated
* Dean, Payne (Ltd.)
* Fulton Co.

Valves, Throttle
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* Jenkins Bros.
Lunkenheimer Co.
* Nordberg Mfg. Co.
* Pittsburgh Valve, Fdry. & Const. Co.
* Reading Steel Casting Co. (Inc.) (Pratt & Cady Division)
* Schutte & Koerting Co.

Valves, Vacuum Heating
* Foster Engineering Co.

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* American Blower Co.
* Clarage Fan Co.

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* Bristol Co.
* General Electric Co.
* Westinghouse Electric & Mfg. Co.
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Vulcanizers
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Farrel Foundry & Machine Co.

Wash Bowls
Manufacturing Equipment & Engrg. Co.

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* Goodrich, B. F. Rubber Co.
* United States Rubber Co.

Water Columns
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* Ashton Valve Co.
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International Filter Co.
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International Filter Co.
* Permutit Co.
* Scaife, Wm. B. & Sons Co.
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Johns-Manville (Inc.)

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* General Electric Co.

Wheels, Car
* Fuller-Lehigh Co.

Wheels, Polishing Paper
Rockwood Mfg. Co.

Whistles, Steam
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* Ashton Valve Co.
* Brown, A. & F. Co.
* Crane Co.
* Crosby Steam Gage & Valve Co.
Lunkenheimer Co.

Winches
* Brown Hoisting Machinery Co.
Lidgerwood Mfg. Co.

Wire, All Metals
Driver-Harris Co.

Wire, Brass and Copper
* Roebling's, John A. Sons Co.

Wire, Flat
* Roebling's, John A Sons Co.

Wire, Iron and Steel
* Roebling's, John A. Sons Co.

Wire and Cables, Electrical
* General Electric Co.
* Roebling's, John A. Sons Co.
* United States Rubber Co.

Wire Mechanism (Eowden Wire)
* Gwilliam Co.

Wire Rope
(See Rope, Wire)

Wire Rope Fastenings
Lidgerwood Mfg. Co.
* Roebling's, John A. Sons Co.

Wire Rope Slings
* Roebling's, John A. Sons Co.

Wiring Devices
* General Electric Co.

Worm Gear Drives
* Cleveland Worm & Gear Co.
* Foote Bros. Gear & Mach. Co.
* James, D. O. Mfg. Co.
* Jones, W. A. Fdry. & Mach. Co.
Link-Belt Co.

Wrapping Machinery
* American Machine & Foundry Co.

Wrenches
* Roebling's, John A. Sons Co.

*Catalogue data of firms marked * appear in the A.S.M.E. Condensed Catalogues of Mechanical Equipment, 1923-24 Volume*

(Mekanik) vol. 53, nos. 24 and 29, June 16 and July 21, 1923, pp. 61–65 and 73–76, 14 figs. Investigation of efficiency at different steam pressures; calculations, and diagrams of pressures; change of heat drop with steam pressure; etc.

Maximum Commercial Efficiency of Steam Turbines, Rob. Dowson. Beama, vol. 13, no. 68, Dec. 1923, pp. 359–365, 2 figs. Relation between thermodynamic efficiency and "Parsons coefficient."

High-Pressure. New Methods in the Construction of Steam Turbines (Neue Wege des Dampfturbinenbaues), W. G. Noack. Elektrischer Betrieb, vol. 21, no. 19, Oct. 10, 1923, pp. 221–223, 5 figs. Describes design of BBC high-pressure turbine, constructed by Brown, Boveri & Cie., which operates with high-pressure and highly superheated steam up to 100 atmos. and 450 deg. cent. Abstracted from BBC-Mitteilungen, May 1923.

Repairing. Correcting Trouble in Small Steam Turbines, R. A. Cultra. Power Plant Eng., vol. 27, no. 24, Dec. 15, 1923, pp. 1221–1223, 6 figs. Deals with oil troubles; sprung shaft or rotor; repair work in plant.

Specifications. Turbine Specifications and Bid for Detroit Municipal Plant. Power, vol. 58, no. 22, Nov. 27, 1923, pp. 844–845. Specifications intended to provide for all labor and materials necessary to furnish turbo-generator units specified.

Torsionmeters, Position of. The Accuracy of Torsionmeters. Mar. Engr. & Nav. Architect, vol. 46, no. 555, Dec. 1923, p. 449, 1 fig. Discussion as to best position for them along line of shafting.

STEEL

Alloy. See ALLOY STEELS.

Classification and Selection. Classification and Selection of Steel, H. B. Knowlton. Forging—Stamping—Heat Treating, vol. 9, no. 11, Nov. 1923, pp. 467–471. Various grades of steel classed according to composition and method of manufacture together with complete review of their properties and applications.

Cold Working. Operations in the Cold Working of Steel. Machy. (Lond.), vol. 23, no. 580, Nov. 8, 1923, pp. 161–167, 23 figs. Machines and methods employed by Arthur Lee & Sons, Sheffield, in manufacture of bright cold-drawn bar, wire, and cold-rolled strip.

Decarburization. Observations on Decarburization, and Nitrogen and Silicon Absorption in the Annealing of Iron and Steel at 1100 to 1300 Deg. Cent. in Pure Nitrogen Stream (Beobachtungen über das Entkohlen, über Stickstoff- und Siliziumaufnahme beim Glühen von Eisen bei 1100 bis 1300° in reinen Stickstoffstrom), P. Oberhoffer and A. Heger. Stahl u. Eisen, vol. 43, no. 48, Nov. 29, 1923, pp. 1474–1476, 4 figs. Time-concentration curves; influence of nitrogen on decarburization and silicon absorption.

High-Speed. See STEEL, HIGH-SPEED.

Manganese. See MANGANESE STEEL.

Rail. A Comparison of the Deoxidation Effects of Titanium and Silicon on the Properties of Rail Steel, G. K. Burgess and G. W. Quick. U. S. Bur. Standards, Technologic Papers, no. 241, Oct. 1, 1923, pp. 581–635, 27 figs. Results of investigation on two series of heats of rail steel, one being finished with additions of ferrosilicon and ferromanganese in ladle and other with ferromanganese split between furnace and ladle with ferrocarbon-titanium added in ladle, planned on basis of a study of manufacture, tests of A rails, and service results of 1000 tons each of titanium-treated and silicon-treated steel.

Silicon, Effect of. The Effect of Silicon on the Thermal Critical Points of Steel, F. L. Meacham. Am. Soc. Steel Treating—Trans., vol. 6, no. 5, Nov. 1923, pp. 635–646, 13 figs. Investigation to ascertain position of points A1, A2, and A3 in iron-carbon-silicon steel and to compare position of these points with those of pure iron-carbon alloys.

Tellurium in. Properties of Steel Containing Tellurium, G. B. Waterhouse and I. N. Zavarine. Iron Age, vol. 112, no. 24, Dec. 13, 1923, pp. 1575–1576, 5 figs. Experimental heat of cast steel; forging qualities and structure; tellurium present as telluride.

Tool. See TOOL STEEL.

STEEL CASTINGS

Manganese. Specializes in Manganese Steel, H. E. Diller. Iron Trade Rev., vol. 73, no. 25, Dec. 20, 1923, pp. 1672–1677, 9 figs. Methods and equipment of foundry at High Bridge, N. J., which successfully turned from production of car wheels and axles to manufacture of manganese steel castings; ferromanganese melted in cupola for converter steel; electric furnace also employed.

Ship. The Manufacture of Heavy Steel Castings for Ships, with Special Reference to Stern Frames, Rudders, Shaft Brackets and Stems, Hugo P. Frear. Soc. Nav. Architects & Mar. Engrs.—advance paper, no. 8, for meeting Nov. 7–8, 1923, 21 pp., 51 figs. on supp. plates. Deals with shrinkage, design, patterns, sand, cores, flasks, molding, ladle and tapping, pouring, defects, welding, shaking out and cleaning, annealing, and straightening; molding of stern frame for U. S. S. Lexington. See abstract in Mar. Eng., vol. 28, no. 12, Dec. 1923, pp. 754–757.

STEEL, HEAT TREATMENT OF

Annealing Sheet Metal. Annealing Sheet Metal for Stamping, F. G. White. Blast Furnace & Steel Plant, vol. 11, no. 12, Dec. 1923, pp. 637–642, 11 figs. Chemical composition of sheets; laboratory study of annealing; mill study—cannon-ball type furnace; hand-fired vs. stoker-fired furnaces; blue annealing. Includes tables giving results of Erichsen's tests.

Bath. New Heat Treatment Bath Permits Handling of Parts in Finished Form. Automotive Industries, vol. 49, no. 23, Dec. 6, 1923, p. 1147, 2 figs. Describes new form in which tools or parts may be treated in finished shape without deformation, oxidation or decarbonizing; developed by Bellis Heat Treating Co.

Methods. Heat-Treatment of Steel with Special Reference to Production, J. W. Urquhart. Machy. (Lond.), vol. 23, no. 583, Nov. 29, 1923, pp. 268–271, 1 fig. Automobile and general springs; considers physical effects produced by varying both quenching temperature and drawing heats permissible.

Salt Baths. Value of Salt Baths for Heat Treating, C. B. Bellis. Forging—Stamping—Heat Treating, vol. 9, no. 11, Nov. 1923, pp. 480–481, 3 figs. Important characteristics of salt baths are melting point, heat conductivity, specific heat and viscosity; urges baths for treating high-speed steel.

STEEL, HIGH-SPEED

Tempering. The Tempering of High-Speed Steels and Their Electrical Resistivity (La trempe des aciers à outils à coupe rapide et leur résistivité), L. Guillet. Revue de Métallurgie, vol. 20, no. 10, Oct. 1923, pp. 656–664, 16 figs. Results of tests showing influence of tempering temperature and period of heating before tempering on resistivity and hardness.

STOKERS

Mechanical. A Crosthwaite Mechanical Stoker. Power Engr., vol. 18, no. 212, Nov. 1923, pp. 422–423, 1 fig. New improved type of stoker and self-cleaning furnace.

STRAIGHTENING MACHINES

Round Bars and Tubes. Continuous Straightening Machines for Round Bars and Seamless Tubes. Iron & Coal Trades Rev., vol. 108, no. 2908, Nov. 23, 1923, p. 771, 4 figs. Straightening machine for small sections; continuous straightening machines for heavy sections; straightening machines for seamless tubes.

STREET RAILWAYS

Cars, Emergency Braking on. Emergency Braking on Electric Cars, D. D. Ewing. Purdue Univ.—Bul., vol. 7, no. 7, July 1923, 162 pp., 89 figs. Report presented to Central Elec. Ry. Assn. of tests made on four electric cars; description of equipment tested, theoretical considerations, and discussion of tests results.

Cars, Light-Weight. Experience Shows Light Cars Increase Net of Interurban Lines, C. T. DeHore. Elec. Ry. Jl., vol. 62, no. 22, Dec. 1, 1923, pp. 927–930, 3 figs. Analysis of operating results on several properties over period of six years showing material reduction in operating costs as compared with heavy cars; light cars take less power and can make schedules better; revenue increases have followed improvements in service made possible.

SUPERHEATED STEAM

Superheating Principles. The Economy of Superheated Steam. Eng. & Boiler House Rev., vol. 37, no. 4, Oct.-Nov. 1923, pp. 100 and 103–104, 2 figs. Elementary facts concerning superheating.

SYMBOLS

Construction Engineering. Standard Terms and Symbols for Construction Engineering (Einheitliche Bezeichnungen für die Entwürfe von Ingenieurbauwerken), H. Schaper. Bautechnik, vol. 1, no. 34, Aug. 10, 1923, pp. 332–333. Presents mathematical symbols, symbols for weight and measure units; terminology for expressions of mechanics and statics; and for dimensions, basic units and weights of steel superstructures; recommended for adoption by German authorities.

Heat and Steam. Report of Progress of Committee Number 20, on the Standardization of Technical Nomenclature. Eng. Education, vol. 14, no. 3, Nov. 1923, pp. 135–141. List of symbols for heat and steam. List of symbols in mechanics and hydraulics adopted by Soc. for Promotion of Eng. Education on June 28, 1918.

T

TEMPERATURE CONTROL

Automatic. An Automatic Temperature Control System. Power Engr., vol. 18, no. 213, Dec. 1923, pp. 454–456, 9 figs. Complete range of instruments and apparatus for automatic control of temperature in industrial processes developed by Cambridge & Paul Instrument Co.

TERMINALS, RAILWAY

Freight and Engine. Michigan Central Completes its Niles, Mich., Yard. Ry. Rev., vol. 73, no. 22, Dec. 1, 1923, pp. 791–794, 7 figs. Larger freight and engine terminal provides better operating conditions.

TESTING MACHINES

Temper Testing. The Pile Temper-Testing Machine, R. G. Johnston. Brass World, vol. 19, no. 11, Nov. 1923, pp. 353–355, 1 fig. Principle of design and method of operation of machine for testing or comparing temper of two pieces of thin non-ferrous strip or wire.

THERMOMETERS

Katathermometers. A New Recording Kata-Thermometer, E. H. J. Schuster. Jl. of Sci. Instruments, vol. 1, no. 1, Oct. 1923, p. 30. Notes on apparatus in which heating and cooling are carried out automatically and a tracing is made consisting of a horizontal line broken every quarter of an hour to give a record of elapsed time, and above this a series of vertical ordinates, each representing by its length number of seconds which instrument took to cool at time of day shown in horizontal line.

TOOL STEEL

Tempering. The Tempering of Tool Steels, J. P. Gill and L. D. Bowman. Am. Soc. Steel Treating—Trans., vol. 4, no. 6, Dec. 1923, pp. 727–742 and (discussion) 742–747, 8 figs. Study of effect of time, temperature and mass on tempering of tool steels, including high-speed steels; it is shown that tempering colors can be produced on surface of piece of steel successively at low temperatures if held for sufficient length of time; molecular rearrangement takes place in hardened steels at atmospheric temperatures; discusses phenomenon of "temper brittleness" as it refers to steels.

TOOLS

Precision, Manufacture of. Manufacturing a Precision Tool, E. Sheldon. Am. Mach., vol. 59, no. 25, Dec. 20, 1923, pp. 903–907, 12 figs. Preparatory operations on frames; threading main and adjusting nuts by tapping; rigid inspection methods.

U

UNEMPLOYMENT

International Association on. The General Assembly of the International Association on Unemployment. Int. Labour Rev., vol. 8, no. 5, Nov. 1923, pp. 689–695. General scheme for prevention of unemployment; organization of vocational guidance; emigration and oversea settlement of unemployed persons; reorganization of Association.

UNIVERSAL JOINTS

Dies for Boot. Dies for Producing a Universal Joint Boot, N. T. Thurston. Machy. (N. Y.), vol. 30, no. 4, Dec. 1923, pp. 253–256, 13 figs. Blanking, drawing, trimming, piercing, flanging, and wiring operations.

V

VOCATIONAL TRAINING

Machinists and Draftsmen. Worth-while Vocational Training, George B. Frazee. Machy. (N. Y.), vol. 30, no. 4, Dec. 1923, pp. 289–293, 5 figs. Features of educational program of Grand Rapids vocational school for giving future machinists and draftsmen well-rounded knowledge of their trade.

W

WAGES

Work on Dangerous Machines. Wage Systems for Work on Dangerous Machines and Their Influence on Accident Prevention (Lohnsysteme an gefährlichen Arbeitsmaschinen und ihr Einfluss auf die Unfallverhütung), H. Kleditz. Zeit. des Vereines deutscher Ingenieure, vol. 67, no. 44, Nov. 3, 1923, pp. 1024–1027. Report on experiences in various industrial districts in Germany, from which it is shown that accidents are no more frequent with piece-rate than with hour-rate system.

WASTE HEAT

Waste-Gas Utilization. Modern Waste-Gas Utilization Plants for the Production of Steam, Hot Water and Hot Air (Neuere Abgasausnutzungsanlagen zur Gewinnung von Dampf, Warmwasser und Warmluft), O. Brandt. Wärme, vol. 46, no. 44, Nov. 2, 1923, pp. 479–482, 5 figs. Discusses importance and possibilities of waste-gas utilization in industrial furnaces of different temperature ranges; use of waste-heat boilers, waste-gas preheaters and waste-gas pocket air heaters in connection with induced-draft installations.

WATER WORKS

Pumping Stations. The Selection of Pumping Equipment from the Standpoint of Station Economy, Frank A. Mazzur. New England Water Works Assn.—Jl., vol. 37, no. 3, Sept. 1923, pp. 242–253 and (discussion) 253–260. Discusses turbine, electric, and oil-engine drive; comparison of operation costs of various types of pumping equipment.

WEIGHING MACHINES

Milligram Loads. Two Machines for Rapidly Weighing Loads of a Few Milligrammes. Jl. of Sci. Instruments, Preliminary Number, May 1922, pp. 15–21, 14 figs. Describes the cantilever balance and the catenary balance, made for special purpose of sorting by weight small spiral filaments used in manufacture of gas-filled lamps.

WELDING

See ELECTRIC WELDING; ELECTRIC WELDING, ARC; OXY-ACETYLENE WELDING.

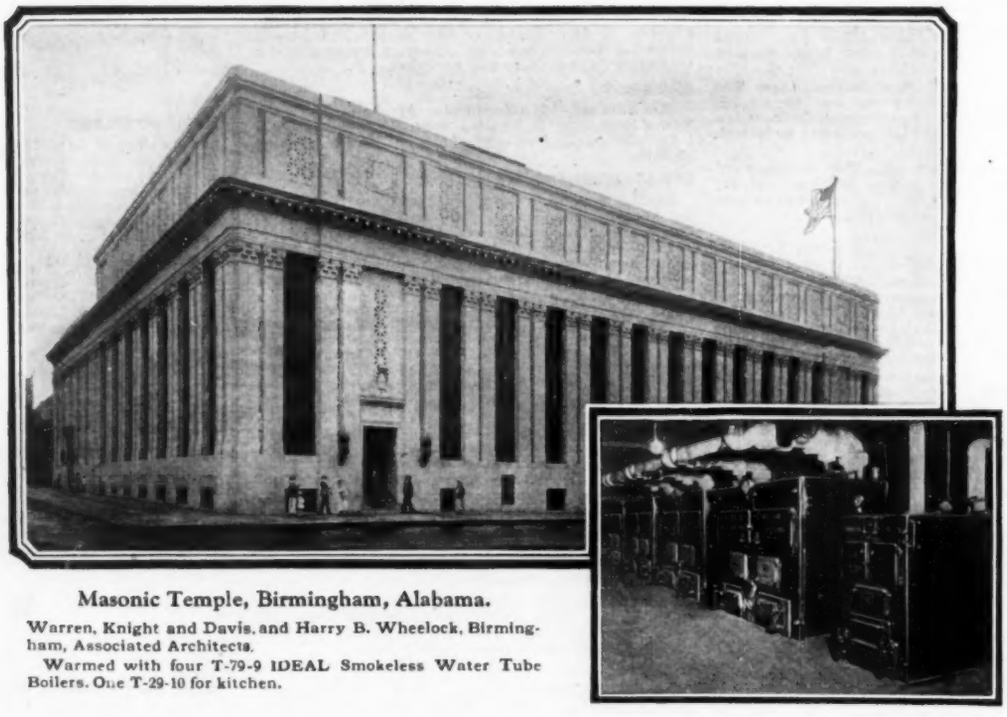
WIND POWER

Germany. Wind Power in Germany (Die Windkraft in Deutschland), Oscar Walter. Zeit. des Vereines deutscher Ingenieure, vol. 67, no. 45, Nov. 10, 1923, pp. 1037–1041, 9 figs. Note on wind intensity in Germany and detailed discussion of fluctuations in performance of wind-power plants; based on official data, gives annual wind-power output for several localities.

WOOD PRESERVATION

Treatment Processes. How Wood Is Treated. Wood Preserving News, vol. 1, no. 10, Nov. 1923, pp. 179–181, 3 figs. Describes standard processes.

Two architects and three engineers agreed on this heating plant



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Warren, Knight and Davis, and Harry B. Wheelock, Birmingham, Associated Architects.

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THE ENGINEERING INDEX presents each month, in conveniently classified form, items descriptive of the articles appearing in the current issues of the world's engineering and scientific press of particular interest to mechanical engineers. At the end of the year the monthly installments are combined along with items dealing with civil, electrical, mining and other branches of engineering, and published in book form, this annual volume having regularly appeared since 1906. In the preparation of the Index by the engineering staff of The American Society of Mechanical Engineers some 1200 technical publications received by the Engineering Societies Library (New York) are regularly reviewed, thus bringing the great resources of that library to the entire engineering profession.

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(See also page 172 of this issue for supplementary items.)

ABRASIVE WHEELS

Diamonds for Dressing. Selection and Use of Diamonds for Dressing Grinding Wheels, W. M. Robinson. Machy. (Lond.), vol. 23, no. 585, Dec. 13, 1923, pp. 321–324, 3 figs. Author explains general practice in handling this work, and presents original information on use of truing diamonds.

Safety Code. Safety Code for the Use, Care, and Protection of Abrasive Wheels. U. S. Bur. Labor Statistics, Bul. No. 338, Apr. 1923, 20 pp. Tentative American standard approved Feb. 11, 1922 by Am. Eng. Standards Committee. Rules and specifications necessary to insure safety in use of abrasive wheels operating at speeds in excess of 2000 surface feet per minute.

AERONAUTICAL INSTRUMENTS

Air-Speed Indicators. Measurement of Air Speed in Aeroplanes, C. J. Stewart. Jl. of Sci. Instruments, vol. 1, no. 2, Nov. 1923, pp. 43–50, 7 figs. Discusses methods adopted to determine value of this speed while in air; principles governing air speed indicator design.

Revolution Counter. An Improved Revolution Counter, B. K. Johnson. Flight, vol. 15, no. 50, Dec. 13, 1923, p. 752, 3 figs. Describes optical instrument for observing behavior of objects revolving at high speed (such as airplane propellers) besides actually recording their speed of rotation.

AERONAUTICS

Progress. Some Aspects of Aeronautical Progress, F. H. Sykes. Roy. Aeronautical Soc.—Jl., vol. 27, no. 156, Dec. 1923, pp. 606–617. Notes on design, research, experiment and operation.

AIR PUMPS

Edwards. The Edwards Air Pump, C. L. Grabham. Commonwealth Engr., vol. 11, no. 3, Oct. 1, 1923, pp. 109–110, 1 fig. Describes pump used in steam-power installations for removing condensed steam and air from condenser and delivering water to hot well where it is handled by feed pumps; pump with 14-in. barrels, 12-in. stroke, single-acting, at 150 r.p.m. will handle 45,000 lb. steam per hour from a surface condenser.

AIRPLANE ENGINES

Cylinder Calculation. Aero-Engine Cylinder Calculations. Practical Engr., vol. 68, no. 1920, Dec. 13, 1923, pp. 333–335, 6 figs. Deals with cooling of water-cooled and air-cooled cylinders; calculation of volume of combustion chamber, valves and ports, stress in cylinder walls, and stress in bolts securing cylinder foot to crankcase.

Light. Review of Foreign Engines for Light Planes. Aviation, vol. 15, no. 26, Dec. 24, 1923, pp. 766–769, 6 figs. Adaptation of motorcycle engines giving way to special horizontal and vertical types.

AIRPLANE PROPELLERS

Direct and Geared Drives. Relative Efficiency of Direct and Geared Drive Propellers, W. S. Diehl. Nat. Advisory Committee for Aeronautics—Report, no. 178, 1923, 9 pp., 3 figs. Shows relative values of various direct and geared drives.

Reed. The Reed Duralumin Airscrew. Aeroplane, vol. 25, no. 21, Nov. 21, 1923, p. 510, 1 fig. Consists of a single plate of duralumin of a thickness of up to 1⅛ in. cut or pressed out to developed blade plan, shaped to required blade sections, and then twisted to required pitch angles throughout its length.

AIRPLANES

Barling Bomber. The Barling Bomber. Flight, vol. 15, no. 50, Dec. 13, 1923, pp. 749–751, 8 figs. Describes N. B. L.-1, a giant American triplane; six 400-hp. Liberty engines; span 120 ft., length 65 ft., chord 13 ft. 6 in., wing area 4180 sq. ft.

Carley. The Carley Light 'Plane. Flight, vol. 15, no. 48, Nov. 29, 1923, pp. 725–728, 7 figs. Monoplane; span 24 ft. 7 in., length 15 ft. 9 in., wing area 109 sq. ft.; 20-hp. Anzani engine.

Commercial. Two Recent American Commercial 'Planes. Flight, vol. 15, no. 52, Dec. 27, 1923, pp. 777–778, 5 figs. Particulars of Lincoln-Standard L. S. 5, a five-seater, fitted with 8-cylinder Hispano-Suiza engine developing 180 hp. at 1750 r.p.m.; and the Laird Limousine, or enclosed cabin-type tractor biplane, fitted with a 300-hp. 12-cylinder Packard engine.

Dietrich-Gobiet. The New Dietrich-Gobiet Biplane (Der neue Dietrich-Gobiet-Doppeldecker), C. Kreuter. Motorwagen, vol. 26, no. 32–33, Nov. 20–30, 1923, pp. 462–463, 4 figs. Details of new D. P. 2 model Bussard, a strutless plane with 50 or 75-hp. Siemens-Stern engine.

Gliders. The Dresden Glider, Type 1923 (Das Segelflugzeug Type 1923 des "Dresdner Segelflugzeugbau), G. Reinhard. Motorwagen, vol. 26, no. 31, Nov. 10, 1923, pp. 452–454, 2 figs. Construction details of one of competing planes of Rhön Competition, 1923.

Guide Cables. Leader Cable Systems for Steering of Aeroplanes. Flight, vol. 15, no. 52, Dec. 27, 1923, pp. 782–785, 9 figs. Brief explanation of principles involved and apparatus used in Loth guide cable. From paper by M. Loth read before Instn. Aeronautical Engrs.

Light. The English Light Plane Meeting and Its Lessons (Der englische Wettbewerb für Kleinflugzeuge und seine Lehren), G. Lachmann. Zeit. für Flugtechnik u. Motorluftschiffahrt, vol. 14, no. 23–24, Dec. 27, 1923, pp. 165–172, 11 figs. Describes airplanes and their engines, performances and conclusions therefrom.

The Pegna "Rondine" Light Monoplane. Flight, vol. 15, no. 52, Dec. 27, 1923, pp. 779–780, 2 figs. Designed for low speeds and high power loading; 400 cc. A. B. C. flat twin engine, developing 5.7 hp. at 3450 r.p.m.; span 32 ft. 10 in., length 19 ft. 7 in., wing area 215 sq. ft.

Light, Use as Models. Light Aeroplanes as Flying Scale Models of Large Machines. Flight, vol. 15, no. 51, Dec. 20, 1923, pp. 761–763, 3 figs. Describes de Montage type 72 light monoplane built to represent a large three-engined commercial monoplane now under construction at works of French Puscaylet-de-Monge firm, as example of manner in which small flying model of a large machine can be used for collecting certain data; two 35-hp. Anzani engines; no fuselage.

Low-Powered. The Construction of Light Airplanes (Bemerkungen zum Klein-Flugzeugbau), W. v. Langsdorff. Motorwagen, vol. 26, no. 31, Nov. 10, 1923, pp. 450–452. Discusses influence of glider construction on development of light airplanes, and describes types of light planes.

Oscillations in Steady Flight. The Small Angular Oscillations of Airplanes in Steady Flight, F. H. Norton. Nat. Advisory Committee for Aeronautics—Report, no. 174, 1923, 8 pp., 5 figs. Investigation carried out to provide data concerning small angular oscillations of several types of airplanes in steady flight under various atmospheric conditions; of use in design of boom sights and other aircraft instruments.

Rondine. The Pegna "Rondine." G. Piecioli Int. Aeronautics, vol. 1, no. 3, Sept. 1923, pp. 93–94, 2 figs. Brief description of new small Italian monoplane with unusually good performance; span 10 meters, wing width 2 m., shape of wing illiptical, length 6 m., height 1.3 m.

Sport. The Kinner "Airster" Sportplane. Flight, vol. 15, no. 49, Dec. 6, 1923, pp. 735–736, 3 figs. Designed and built by Kinner Airplane & Motor Corp., Glendale, Cal., with 60-hp. 3-cylinder, air-cooled "Kinner" engine, mounted in nose of fuselage.

Struts. Compressive Strength of Tapered Airplane Struts, Viktor Lewe. Nat. Advisory Committee for Aeronautics—Tech. Notes, no. 171, Dec. 1923, 8 pp., 1 fig. Methods for ascertaining value of n in Euler's simplified formula for compressive strength of tapered airplane struts, by estimating from curves and by calculation. Translated from Technische Berichte, vol. 3, no. 7.

Wind-Tunnel Tests. Tests on a Model of the D Airplane T 39 of the "Deutsche Flugzeug Werke" (German Airplane Works), W. Molthan. Nat. Advisory Committee for Aeronautics—Tech. Notes, no. 175, Jan. 1924, 23 pp., 7 figs. Results of experiments made in small wind tunnel of Göttingen laboratory. Translated from Technische Berichte, vol. 3, no. 7.

Wing-Cutting Equipment. The Nichols Wing Cutting Equipment, Jas. B. Ford. Nat. Advisory Committee for Aeronautics—Tech. Notes, no. 172, Dec. 1923, 6 pp., 5 figs. on supp. plates. Designed and built in order to meet long-felt necessity for means of producing metal wings for wind-tunnel tests which would be accurate and fair, and yet within price commensurate with value of model wing test.

Wright Brothers. Two Authoritative Accounts of the Wright Brother's Flying Experiments. Aviation, vol. 15, no. 25, Dec. 17, 1923, pp. 732–741, 6 figs. Contains following articles: The Wright Brothers' Aeroplane, Orville and Wilbur Wright (reprinted from Century Mag., Sept. 1908); and How We Made the First Flight, Orville Wright (reprinted from Flying, Dec. 1913).

AIRSHIPS

Rigid. Z. R. 1, The First American-Built Rigid Airship. Flight, vol. 15, no. 48, Nov. 29, 1923, pp. 721–723, 5 figs. Particulars of design and construction, and details of successfully accomplished trial flight.

ALCOHOL

Automobile Fuel. The Carburetion of Alcohol, A. W. Scarratt. Sugar, vol. 25, no. 12, Dec. 1923, pp. 662–663. Factors necessary to successful use of alcohol in combustion engines.

ALLOYS

Aluminum. See ALUMINUM ALLOYS.

Gun Metal. See GUN METAL.

Zinc-Copper, X-Ray Analysis of. X-Ray Analysis of Zinc-Copper Alloys, E. A. Owen and G. D. Presto. Physical Soc. Lond.—Proc., vol. 36, Pt. 1, Dec. 15, 1923, pp. 49–66, 5 figs. Account of results obtained in study of zinc-copper series.

ALUMINUM

Charges in. Charges of Foreign Matter in Aluminum (Fremdstoffeinschlüsse im Aluminium), J. Czochralski. Zeit. für Metallkunde, vol. 15, no. 10, Oct. 1923, pp. 273–283, 33 figs. Oxidic, carbide, phosphide and sulphide charges and charges of metallic sodium; metallographic characteristics; influences of

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NOTE.—The abbreviations used in indexing are as follows:

Academy (Acad.)
American (Am.)
Associated (Assoc.)
Association (Assn.)
Bulletin (Bul.)
Bureau (Bur.)
Canadian (Can.)
Chemical or Chemistry (Chem.)
Electrical or Electric (Elec.)
Electrician (Elecn.)
Engineer[s] (Engr.[s])
Engineering (Eng.)
Gazette (Gaz.)
General (Gen.)
Geological (Geol.)
Heating (Heat.)
Industrial (Indus.)
Institute (Inst.)
Institution (Instn.)
International (Int.)
Journal (Jl.)
London (Lond.)
Machinery (Machy.)
Machinist (Mach.)
Magazine (Mag.)
Marine (Mar.)
Materials (Matls.)
Mechanical (Mech.)
Metallurgical (Met.)
Mining (Min.)
Municipal (Mun.)
National (Nat.)
New England (N. E.)
Proceedings (Proc.)
Record (Rec.)
Refrigerating (Refrig.)
Review (Rev.)
Railway (Ry.)
Scientific or Science (Sci.)
Society (Soc.)
State names (Ill., Minn., etc.)
Supplement (Supp.)
Transactions (Trans.)
United States (U. S.)
Ventilating (Vent.)
Western (West.)

Classified List of Mechanical Equipment

Manufactured by Firms Represented in MECHANICAL ENGINEERING

FOR ALPHABETICAL LIST OF ADVERTISERS, SEE PAGE 156

Accumulators, Hydraulic
Farrel Foundry & Machine Co.
Mackintosh-Hemphill Co.
* Worthington Pump & Mchry. Corp'n

Aftercoolers, Air
* Ingersoll-Rand Co.

Air Compressors, Receivers, etc.
(See Compressors, Receivers, etc., Air)

Air Conditioning Apparatus
* American Blower Co.
* Carrier Engineering Corp'n
* Clarage Fan Co.
* Sturtevant, B. F. Co.

Air-Jet Lifts
* Schutte & Koerting Co.

Air Washers
* American Blower Co.
* Carrier Engineering Corp'n
* Clarage Fan Co.
* Cooling Tower Co. (Inc.)
* Spray Engineering Co.
* Sturtevant, B. F. Co.

Alloys
Driver-Harris Co.

Alloys (Calite)
Calorizing Co.

Ammeters
* Bristol Co.
* General Electric Co.
* Westinghouse Electric & Mfg. Co.

Anemometers
* Taylor Instrument Cos.
Weber, F. Co. (Inc.)

Annealing
* American Metal Treatment Co.

Arc Welding Equipment
* Westinghouse Elect. & Mfg. Co.

Arches, Boiler Furnace
* Liptak Fire-Brick Arch Co.
* McLeod & Henry Co.
* Titusville Iron Works Co.

Arches, Fire Door
* McLeod & Henry Co.

Arches, Ignition (Flat Suspended)
* Combustion Engineering Corp'n
* Liptak Fire-Brick Arch Co.
* McLeod & Henry Co.

Asbestos Products
Carey, Philip Co.
Garlock Packing Co.
Johns-Manville (Inc.)

Autoclaves
Farrel Foundry & Machine Co.

Axles, Car
* Fuller-Lehigh Co.

Babbitt Metal
* Medart Co.
* Westinghouse Electric & Mfg. Co.

Ball Bearings, Gages, etc.
(See Bearings, Gages, Ball)

Balls, Brass and Bronze
* Gwilliam Co.

Balls, Steel
* Atlas Ball Co.
* Gwilliam Co.
* New Departure Mfg. Co.
* S K F Industries (Inc.)

Barometers
* American Schaeffer & Budenberg Corp'n
* Taylor Instrument Cos.

Barometers, Mercurial
* Tagliabue, C. J. Mfg. Co.

Bearings, Ball
Fafnir Bearing Co.
Gurney Ball Bearing Co.
* Gwilliam Co.
* New Departure Mfg. Co.
* Norma Co. of America
* S K F Industries (Inc.)
* U. S. Ball Bearing Mfg. Co.

Bearings, Radial Thrust
* New Departure Mfg. Co.

Bearing, Roller
* Gwilliam Co.
* Hyatt Roller Bearing Co.
* Norma Co. of America
* Royersford Fdry. & Mach. Co.
* Timken Roller Bearing Co.

Bearings, Self-Oiling
* Brown, A. & F. Co.
* Doehler Die-Casting Co.
* Falls Clutch & Machinery Co.
* Jones, W. A. Fdry. & Mach. Co.
Link-Belt Co.
* Royersford Fdry. & Mach. Co.
* Wood's, T. B. Sons Co.

Bearings, Thrust
Fafnir Bearing Co.
* General Electric Co.
* Gwilliam Co.
* Norma Co. of America
* S K F Industries (Inc.)
* Timken Roller Bearing Co.
* U. S. Ball Bearing Mfg. Co.

Belt Dressing
* Dixon, Joseph Crucible Co.
Gandy Belting Co.

Belt Lacing, Steel
* Bristol Co.

Belt Tighteners
* Brown, A. & F. Co.
* Jones, W. A. Fdry. & Mach. Co.
Link-Belt Co.
* Medart Co.
* Smidth, F. L. & Co.
* Wood's, T. B. Sons Co.

Belting, Canvas (Stitched)
Gandy Belting Co.
* United States Rubber Co.

Belting, Conveyor
Gandy Belting Co.
* Goodrich, B. F. Rubber Co.
* United States Rubber Co.

Belting, Elevator
Gandy Belting Co.
* Goodrich, B. F. Rubber Co.
* United States Rubber Co.

Belting, Endless
Gandy Belting Co.

Belting, Fabric
Gandy Belting Co.

Belting, Leather
American Sole & Belting Leather Tanners (Inc.)

Belting, Rubber
* Goodrich, B. F. Rubber Co.
* United States Rubber Co.

Belting, Waterproof
Gandy Belting Co.

Benches, Work
Manufacturing Equip. & Engrg. Co.

Bending & Straightening Machines
* Long & Allstatter Co.

Bends, Pipe
* Frick Co. (Inc.)
* Vogt, Henry Machine Co.

Billets, Steel
* Timken Roller Bearing Co.

Bleaching Machinery
Philadelphia Drying Mchry. Co.

Blocks, Tackle
Clyde Iron Works Sales Co.
* Roebling's, John A. Sons Co.

Blowers, Centrifugal
* American Blower Co.
* Clarage Fan Co.
* Coppus Engineering Corp'n
* De Laval Steam Turbine Co.
* General Electric Co.
* Ingersoll-Rand Co.
* Kerr Turbine Co.
* Sturtevant, B. F. Co.
* Westinghouse Electric & Mfg. Co.

Blowers, Fan
* American Blower Co.
* Clarage Fan Co.
* Coppus Engineering Corp'n
* Green Fuel Economizer Co.
* Sturtevant, B. F. Co.

Blowers, Forge
* Sturtevant, B. F. Co.

Blowers, Pressure
* American Blower Co.
* Clarage Fan Co.
Lammert & Mann Co.
* Sturtevant, B. F. Co.

Blowers, Rotary
Fletcher Works
Lammert & Mann Co.
* Schutte & Koerting Co.
* Sturtevant, B. F. Co.

Blowers, Soot
Diamond Power Specialty Corp'n
* Sturtevant, B. F. Co.

Blowers, Steam Jet
* Schutte & Koerting Co.

Blowers, Turbine
* Coppus Engineering Corp'n
* Sturtevant, B. F. Co.

Blueing (Metal)
* American Metal Treatment Co.

Boards, Drawing
Dietzgen, Eugene Co.
Electro Sun Co. (Inc.)
Keuffel & Esser Co
New York Blue Print Paper Co.
ParVell Laboratories
U. S. Blue Co.
Weber, F. Co. (Inc.)

Boiler Baffles
* King Refractories Co. (Inc.)
* McLeod & Henry Co.

Boiler Compounds
* Dixon, Joseph Crucible Co.
Unisol Mfg. Co.

Boiler Coverings, Furnaces, Tube Cleaners, etc.
(See Coverings, Furnaces, Tube Cleaners, etc., Boiler)

Boiler Fronts
* Brownell Co.
* O'Brien, John Boiler Works Co.
* Titusville Iron Works Co.

Boiler Settings, Steel Cased
* Brownell Co.
* Casey-Hedges Co.
* McLeod & Henry Co.
* O'Brien, John Boiler Works Co.
* Vogt, Henry Machine Co.
* Walsh & Weidner Boiler Co.

Boilers, Heating
* Brownell Co.
* Casey-Hedges Co.
* Erie City Iron Works
Herbert Boiler Co.
* Keeler, E. Co.
* Leffel, James & Co.
Lidgerwood Mfg. Co.
* O'Brien, John Boiler Works Co.
* Titusville Iron Works Co.
* Union Iron Works
* Walsh & Weidner Boiler Co.

Boilers, Locomotive
* Brownell Co.
* Casey-Hedges Co.
* Keeler, E. Co.
* Leffel, James & Co.
* Titusville Iron Works Co.
* Union Iron Works
* Walsh & Weidner Boiler Co.

Boilers, Marine (Scotch)
* Brownell Co.
* Casey-Hedges Co.
* Leffel, James & Co.
* Titusville Iron Works Co.
* Walsh & Weidner Boiler Co.

Boilers, Marine (Water Tube)
* Babcock & Wilcox Co.
Bethlehem Shipbldg.Corp'n(Ltd.)
* Casey-Hedges Co.
* Connelly, D. Boiler Co.
* O'Brien, John Boiler Works Co.
* Springfield Boiler Co.
* Titusville Iron Works Co.
* Walsh & Weidner Boiler Co.
* Ward, Charles Engineering Wks.

Boilers, Portable
* Brownell Co.
* Casey-Hedges Co.
* Erie City Iron Works
* Frick Co. (Inc.)
Herbert Boiler Co.
* Keeler, E. Co.
* Leffel, James & Co.
Lidgerwood Mfg. Co.
* O'Brien, John Boiler Works Co.
* Titusville Iron Works Co.
* Union Iron Works
* Walsh & Weidner Boiler Co.

Boilers, Tubular (Horizontal Return)
* Bigelow Co.
* Brownell Co.
* Casey-Hedges Co.
* Cole, R. D. Mfg. Co.
* Connelly, D. Boiler Co.
* Erie City Iron Works
Herbert Boiler Co.
* Keeler, E. Co.
* Leffel, James & Co.
Lidgerwood Mfg. Co.
Morrison Boiler Co.
* O'Brien, John Boiler Works Co.
* Titusville Iron Works Co.
* Union Iron Works
* Vogt, Henry Machine Co.
* Walsh & Weidner Boiler Co.
* Ward, Charles Engineering Wks.
* Webster, Howard J.
* Wickes Boiler Co.

Boilers, Tubular (Vertical Fire)
* Bigelow Co.
* Brownell Co.
* Casey-Hedges Co.
Clyde Iron Works Sales Co.
* Keeler, E. Co.
* Leffel, James & Co.
Lidgerwood Mfg. Co.
Morrison Boiler Co.
* O'Brien, John Boiler Works Co.
* Titusville Iron Works Co.
* Union Iron Works
* Walsh & Weidner Boiler Co.

Boilers, Water Tube (Horizontal)
* Babcock & Wilcox Co.
* Casey-Hedges Co.
* Cole, R. D. Mfg. Co.
* Connelly, D. Boiler Co.
* Edge Moor Iron Co.
* Erie City Iron Works
Herbert Boiler Co.
* Keeler, E. Co.
* Ladd, George T. Co.
Morrison Boiler Co.
* O'Brien, John Boiler Works Co.
* Springfield Boiler Co.
* Union Iron Works
* Vogt, Henry Machine Co.
* Walsh & Weidner Boiler Co.
* Wickes Boiler Co.

Boilers, Water Tube (Inclined)
* Babcock & Wilcox Co.
* Bigelow Co.
* Casey-Hedges Co.
* Keeler, E. Co.
* Ladd, George T. Co.
Morrison Boiler Co.
* O'Brien, John Boiler Works Co.
* Vogt, Henry Machine Co.
* Walsh & Weidner Boiler Co.
* Ward, Charles Engineering Wks.

Boilers, Water Tube (Vertical)
* Babcock & Wilcox Co.
* Bigelow Co.
* Casey-Hedges Co.
* Erie City Iron Works
* Keeler, E. Co.
* Ladd, George T. Co.
Morrison Boiler Co.
* O'Brien, John Boiler Works Co.
* Walsh & Weidner Boiler Co.
* Wickes Boiler Co.

Boxes, Carbonizing
Driver-Harris Co.

Boxes, Case Hardening
Driver-Harris Co.

Boxes, Water Service
Murdock Mfg. & Supply Co.

Brake Blocks
Johns-Manville (Inc.)

Brakes, Air
* Allis-Chalmers Mfg. Co.
* General Electric Co.

Brass Goods
* Scovill Mfg. Co.

Brass Mill Machinery
Farrel Foundry & Machine Co.

Breechings, Smoke
* Brownell Co.
Morrison Boiler Co.
* Titusville Iron Works Co.
* Vogt, Henry Machine Co.

Brick, Fire
* Bernitz Furnace Appliance Co.
* Celite Products Co.
* Drake Non-Clinkering Furnace Block Co.
Keystone Refractories Co.
* King Refractories Co. (Inc.)
* McLeod & Henry Co.

Brick Insulating
* Celite Products Co.
* Quigley Furnace Specialties Co.

Bridges, Coal & Ore Handling
* Brown Hoisting Machinery Co.
Link-Belt Co.

Bridgewalls (Furnace)
* McLeod & Henry Co.

Buckets, Elevator
* Brown Hoisting Machinery Co.
Chain Belt Co.
* Gifford-Wood Co.
* Hendrick Mfg. Co.
* Jones, W. A. Fdry. & Mach. Co.
Link-Belt Co.

*Catalogue data of firms marked * appear in the A.S.M.E. Condensed Catalogues of Mechanical Equipment, 1923-24 Volume*

mechanical properties. Research work of committee for aluminum and light alloys of German Metallographical Soc.

ALUMINUM ALLOYS

Analysis. Contributions to the Quantitative Determination and Separation of Aluminum (Beiträge zur quantitativen Bestimmung und Trennung des Aluminiums), G. Jander and B. Weber. Zeit. für angewandte Chemie, vol. 36, no. 75, Dec. 3, 1923, pp. 586–590, 1 fig. Describes method of analysis for aluminum alloys by which it is possible to separate quantitatively the aluminum from the other alloy components.

AMMONIA

Equilibrium. The Ammonia Equilibrium, A. T. Larson and R. L. Dodge. Am. Chem. Soc.—Jl., vol. 45, no. 12, Dec. 1923, pp. 2918–2930, 3 figs. Computation of equilibrium values and constants, calculation of percentage of ammonia at equilibrium for temperature range of 200–1000 deg. and pressure range of 10–100 atmos.

ASH HANDLING

Power Stations. Ash Disposal, G. F. Zimmer. Electrician, vol. 91, no. 2380, Dec. 28, 1923, pp. 721–725, 5 figs. Details of appliances now used in power stations.

AUTOMOBILE ENGINES

Air-Cooled. The Future of the Air-Cooled Car, V. W. Pagé. Sci. Am., vol. 130, no. 1, Jan. 1924, pp. 22–23 and 71, 7 figs. Engineering and operating facts that call for its most serious consideration.

Balance. Balance of the Cadillac V-63 Engine, E. W. Seaholm. Soc. Automotive Engrs.—Jl., vol. 14, no. 1, Jan. 1924, pp. 70–73, 5 figs. Points out that Gen. Motors Research Laboratories has investigated possibility of counteracting couples connected with this type of shaft and has arrived at solution through employment of compensating weights properly proportioned and disposed along crankshaft; this method of balancing had its first application in 8-cylinder engines built by Cadillac Motor Car Co.

Design. Petrol Engines, A. T. J. Kersey. Instn. Mech. Engrs.—Proc., vol. 1, no. 3, 1923, pp. 493–506 and (discussion) 507–510, 8 figs. Discusses problems of design, including elimination of noise and vibration; freedom from breakdowns; accessibility for examination, adjustments and renewals; flexibility; economy in fuel consumption; reduction in weight and space occupied per hp.; and low cost of production.

Desprez Head. Overhead Valves for Side-Valve Engines. Autocar, vol. 51, no. 1470, Dec. 21, 1923, pp. 1229–1230, 3 figs. Test of a French device, the Desprez, designed to increase power of a standard 11.4-hp. Citroën car.

Heavy-Oil. The Bagnulo Engine (Der Bagnulo-Motor). Della Porta. Motorwagen, vol. 26, nos. 32–33 and 34, Nov. 20–30 and Dec. 10, 1923, pp. 460–461 and 481–483, 7 figs. Details of engine, developed by Italian engineer, which works only with heavy oil without addition of benzol or gasoline.

Misuse and Efficient Application. The Misuse of the Internal Combustion Engine, and Suggestions for Its More Efficient Application, L. Murphy. Automobile Engr., vol. 13, no. 184, Dec. 1923, pp. 409–415, 10 figs. Outlines limitations of variable-ratio method as means of economically transmitting output of gasoline engine to road wheels, and discusses possible alternatives.

New York Show. Distinct Progress Shown in Engine Design, A. Ludlow Clayden. Automotive Industries, vol. 50, no. 2, Jan. 10, 1924, pp. 61–64, 8 figs. Greater output per cu. in. of piston displacement secured; power plants are superior to those of year ago; larger bearing areas and lighter stresses have increased durability.

Radiator Non-Freeze Solutions. Non-Freeze Solutions for the Radiator. Motor Transport (N. Y.), vol. 29, no. 9, Dec. 1, 1923, pp. 304–305 and 308, 4 figs. Common difficulties with alcohol and glycerine solutions and suggested remedies; raising of boiling point of alcohol solutions important; pooling purchases proves economical.

AUTOMOBILE FUELS

Alcohol. See ALCOHOL.

Crankcase-Oil Dilution. Crankcase-Oil Dilution, E. F. Hallock. Soc. Automotive Engrs.—Jl., vol. 14, no. 1, Jan. 1924, pp. 57–62. Presents tabular data to show how end points have risen since 1910, together with data showing effects of various percentages of fuel dilution with relation to Saybolt viscosities and pour points of high-grade oils; points out that contamination, not dilution, necessitates oil drainage; use of heavier-bodied oils decried; how to avoid crankcase dilution, and oil sludging; proper oil specification.

Heavy Oils. Heavy Oils for Automobile Engines (Schweröl betrieb bei Kraftwagen), Erwin Aders. Maschinenbau, vol. 2, no. 20, July 13, 1923, pp. G220–G224, 12 figs. Discusses difficulties in use of heavy oils and measures for combating them.

AUTOMOBILES

All-Wheel Functioning. All-wheel Functioning. Motor Transport (Lond.), vol. 37, no. 982, Dec. 24, 1923, pp. 823–824, 3 figs. Demonstration of possibilities of an experimental chassis having four wheels driven, braked, steered and independently sprung.

Belgian Show. Wide Range of Automotive Products Exhibited at Belgian Show, W. F. Bradley. Automotive Industries, vol. 49, no. 26, Dec. 27, 1923, pp. 1293–1295, 11 figs. Models not appearing at previous European exhibits include Imperia, with sleeve-valve engine and six-cylinder Austro-Daimler.

Bodies. Low Priced Closed Cars Increase in Number, H. Chase. Automotive Industries, vol. 50, no. 2, Jan. 10, 1924, pp. 72–77, 27 figs. Better-looking radiators have improved frontal appearance and hood lines; sport models still popular.

The "Weymann" Body-Construction. Auto-Motor Jl., vol. 28, no. 50, Dec. 13, 1923, pp. 1099–1101, 5 figs. Analysis from coach-builder's and owner-driver's standpoints.

Brakes. Four-Wheel Brakes Are Most Striking Mechanical Feature of (New York) Show, P. M. Heldt. Automotive Industries, vol. 50, no. 2, Jan. 10, 1924, pp. 64–70, 25 figs. Standard equipment on 44 models and optional on 37; hydraulically operated systems strongly represented; new braking methods affect front axles; clutch improvements.

Chrysler. Chrysler Six Appears with Seven Bearing Crankshaft. Automotive Industries, vol. 69, no. 26, Dec. 27, 1923, pp. 1290–1292, 9 figs. Engine is L-head type; has piston displacement of 201 cu. in.; bore is 3 in. and stroke 4¾ in.; produced in Chalmers plant.

Cubitt. The 16 Hp. Cubitt Car. Auto-Motor Jl., vol. 28, no. 50, Dec. 13, 1923, pp. 1093–1096, 14 figs. British designed and manufactured car of great efficiency, roomy comfort, and low cost.

Electric. Storage-Battery-Driven Cars (La traction sur route par accumulateurs), Jean Boës. Revue Générale de l'Électricité, vol. 14, nos. 23 and 24, Dec. 8 and 15, 1923, pp. 905–916 and 967–988, 55 figs. Gives statistical data to show use of storage-battery cars, both for passengers and trucks, in all civilized parts of world; author deplores that this type of traction is practically unknown in France and points to America as country with widest use of such vehicles; gives number of comparative cost figures for gasoline-driven and electric cars, showing considerable saving for electric car. Bibliography.

The Electric Battery Vehicle, H. E. Dance. Instn. Elec. Engrs.—Jl., vol. 61, no. 323, Oct. 1923, pp. 1100–1108, 5 figs. Refers to early failure of electric-battery vehicle and to misconceptions which exist as to its proper duty; discusses question of transmission and control; information regarding methods of charging; includes table showing characteristics of two chief types of batteries.

The New SB Electric One-Seater (Der neue SB-Selbstfahrer), H. Salby. Motorwagen, vol. 26, no. 31, Nov. 10, 1923, pp. 446–449, 5 figs. Describes new type of electric car for city use which is made to sell for 600 gold mark, or about $150; weight of car is 180 kg.; new features of SB engine.

Electrical-Equipment Repairs. The Engineer's Duty in Simplifying Electrical-Equipment Repairs, J. W. Tracy. Soc. Automotive Engrs.—Jl., vol. 14, no. 1, Jan. 1924, pp. 11–12. Selection and application of apparatus is stated to be starting point in simplifying repairs to electrical equipment; notes on maintenance of repair-parts stock; dissemination of technical information and explicit service instructions for new apparatus.

Equipment, German Show. Automobile Equipment at the German Automobile Show 1923 (Auto-Zubehör auf der Deutschen Automobil-Ausstellung 1923), Hans-Georg Bock. Allgemeine Automobil-Zeitung, vol. 24, nos. 39, 40, 41, 42–43, 44 and 45–46, Oct. 2, 6, 11, 26, Nov. 6 and 16, 1923, pp. 37–38, 35–36, 25–26, 19–21, 21–23 and 18–21. Exhibits of ball bearings, tires, iron and steel parts, lamps, measuring instruments, coolers, piston rings, jacks and tools, wheels, vulcanizers and air pumps, etc.

Fiat. Care and Maintenance of the 10–15 Hp. Fiat. Autocar, vol. 51, nos. 1469 and 1470, Dec. 14 and 21, 1923, pp. 1169–1172 and 1233–1235, 13 figs. Dec. 14: Engine and its auxiliaries. Dec. 21: Transmission system and chassis details.

German. The Moll Automobile (Der Moll-Wagen). Motorwagen, vol. 26, nos. 31 and 32–33, Nov. 10 and 20–30, 1923, pp. 454–455 and 466–467, 2 figs. Details of 6/30-hp. 4-seater of medium size.

Hupmobile. The Hupmobile Car. Auto-Motor Jl., vol. 28, no. 51, Dec. 20, 1923, pp. 1115–1118, 10 figs. American car; roomy, comfortable bodywork, good springing and a sturdy powerful engine.

Miesse. The 15 Hp. Miesse Car. Auto-Motor Jl., vol. 28, no. 49, Dec. 6, 1923, pp. 1071–1074, 9 figs. Belgian car; has actual power of 35 hp.; four-cylinder engine.

New York Show. Interest Focuses on New Car Announcements. Automotive Industries, vol. 50, no. 2, Jan. 10, 1924, pp. 78–81, 3 figs. Details of new models shown for first time at New York Show; features of improvements.

Packard. Packard Adopts Four-Wheel Brakes on Single Six. Automotive Industries, vol. 49, no. 26, Dec. 27, 1923, pp. 1304–1305, 1 fig. External contracting type with half-wrap are used on back wheels and internal expanding shoes on front; equipment includes bar-type equalizers, located between front and rear operating systems.

Parts. Parts Manufacturers Exhibit New Products. Automotive Industries, vol. 50, no. 2, Jan. 10, 1924, pp. 81–84, 5 figs. Seven-speed gearset, taxicab engine, new drag-link design, oil purifier, car heater brake equalizer, and windshield cleaner are among new units presented at New York Show.

Phoenix. The 18 Hp. Phoenix Chassis. Automobile Engr., vol. 13, no. 184, Dec. 1923, pp. 386–392, 14 figs. Noticeable feature is wide employment of pressed-steel parts, generally of rather light gage; drive is taken from overhead-valve engine through metal-to-metal cone clutch to 3-speed gear box, final drive being by spiral bevel.

Pierce-Arrow. Pierce-Arrow Added to List of Cars Fitted with Front-Wheel Brakes. Automotive Industries, vol. 50 no. 1, Jan. 3, 1924, pp. 5–6, 2 figs. Adopts construction in which operating shafts are carried on axle center; reverse Elliott knuckle has vertical axis which meets ground more than 2 in. from central point of tire contact; provision against locking front wheels considered unnecessary.

Racing. Racing Cars (Renn-Wagentypen), K. C. Volkhart. Motorwagen, vol. 26, no. 32–33, Nov. 20–30, 1923, pp. 457–458, 5 figs. Discusses types participating in Avus Race.

Repair Service. How Engineers Can Coöperate to Make Flat-Rate Service a Success, J. Willard Lord. Soc. Automotive Engrs.—Jl., vol. 14, no. 1, Jan. 1924, pp. 20–22. Points out need of coöperation of engineering and maintenance; development of special tools; reduction of parts expense; price of repair parts.

Providing the Engineer with Service Data, O. T. Kreusser. Soc. Automotive Engrs.—Jl., vol. 14, no. 1, Jan. 1924, pp. 63–67 and 73, 2 figs. Tendencies of industry; maintenance troubles; field information; recording service data; coöperation between factory and service men.

Standards. Standards Committee Division Reports. Soc. Automotive Engrs.—Jl., vol. 14, no. 1, Jan. 1924, pp. 37–56, 13 figs. Reports of Divisions on agricultural-power equipment, axle and wheels, frames, lubricants, non-ferrous metals, motorboats, passenger-car bodies, parts and fittings, storage batteries, screw threads, tires and rims.

Stutz. Stutz to Build Engine for New Model in Its Own Plant, J. Ed. Schipper. Automotive Industries, vol. 49, no. 26, Dec. 27, 1923, pp. 1296–1300, 3 figs. Speedway Six is larger than special announced last year; dimensions of cylinders are 3½ by 5 in.; compression ratio is 4.45 to 1; balloon tires and 4-wheel brakes are optional equipment.

Transmissions. Variable Transmission, G. Constantinesco. Automobile Engr., vol. 13, no. 184, Dec. 1923, pp. 396–400, 8 figs. Critical consideration of problem.

AVIATION

Air-Mail Service. Annual Report on the U. S. Air Mail Service. Aviation, vol. 15, no. 26, Dec. 24, 1923, pp. 770–771, 1 fig. Mail planes flew 1,800,000 mi. with 67,800,000 letters making 96.72 per cent performance.

Naval. The United States Naval Air Service, 1922–23, Wm. A. Moffett. Aviation, vol. 16, no. 2, Jan. 14, 1923, pp. 34–37. Numerous new types of aircraft and engines developed for naval requirements. (Abstract.) Report of activities of U. S. Nav. Air Service during fiscal year ended June 30, 1923.

B

BALANCING

Problems. Problems of Balancing (Auswuchtfragen), H. Hort. Maschinenbau, vol. 2, no. 25–26, Sept. 29, 1923, pp. G271–G277, 18 figs. Describes new static and dynamic balancing machines; practical aspects for balancing.

BEARING METALS

Car Bearings. Investigation of Bearing Metals for Railway Practice (Untersuchung über Lagermetalle für den Eisenbahnbetrieb), J. Karafiat. Zeit. des Oesterr. Ingenieur- u. Architekten-Vereines, vol. 75, no. 33–35, Aug. 31, 1923, pp. 219–231, 2 figs. Investigation of bearing alloy consisting of tin, copper, antimony and lead.

BEARINGS

Anti-Friction. Journal Boxes with Anti-Friction Bearings, O. R. Wikander. Ry. Mech. Engr., vol. 98, no. 1, Jan. 1924, pp. 33–35, 3 figs. Discusses possible standardization of ball and roller bearings for railway cars.

Journal, Pad System Applied to. The Pad System Applied to Journal Bearings, Johnstone-Taylor. Am. Mach., vol. 60, no. 1, Jan. 3, 1924, pp. 9–10, 4 figs. Design of bearings constructed on pad system and their advantages.

Suspended. Progress in Transmission Construction (Fortschritte im Transmissionsbau), F. Wilcke. Praktischer Maschinen-Konstrukteur, vol. 56, no. 36–37, Sept. 18, 1923, 4 pp., 8 figs. Describes latest type of Flender suspension bearings with ring lubrication, and Flender friction coupling, and points out their advantages.

BEARINGS, ROLLER

Spherical. The Solution of the Railway Bearing Problem through the SKF Spherical Roller Bearing (Die Lösung der Eisenbahnlagerfrage durch das SKF sphärische Rollenlager), F. Nussbaum. Zeit. des Oesterr. Ingenieur- u. Architekten-Vereines, vol. 75, no. 33–35, Aug. 31, 1923, pp. 208–218, 16 figs. Notes on rolling resistance of railway cars; tests with spherical roller and other bearings; load capacity of ball and roller bearings; details of spherical rolling bearings and saving in coal effected by their use.

BELTING

Leather. How to Select, Install and Care for Leather Belting, C. O. Streeter. Belting, vol. 23, no. 6, Dec. 1923, pp. 39–42, 3 figs. Description of best methods of securing efficient power transmission through leather belting; principles of power transmission.

Instructions for Making Leather Belts Endless, L. W. Arny. Nat. Engr., vol. 27, nos. 9 and 11, Sept. and Nov. 1923, pp. 413–416 and 543–546, 18 figs. Procedure in making joints in different kinds of belts; different kinds of cement and their application; tools required and how to use them; lubrication of belts.

BLAST FURNACES

Linings. Reducing Lining Disintegration H. E. Townsend. Iron Trade Rev., vol. 75, no. 3, an. 17, 1924, pp. 232–234, 2 figs. After two linings high in

Manufactured by Advertisers — CLASSIFIED LIST OF MECHANICAL EQUIPMENT — Alphabetical List on page 156

Buckets, Grab
* Brown Hoisting Machinery Co.
Clyde Iron Works Sales Co.
Lidgerwood Mfg. Co.
Link-Belt Co.

Buckets, Self-Dumping
* Brown Hoisting Machinery Co.
Clyde Iron Works Sales Co.
Link-Belt Co.

Burners, Oil
Bethlehem Shipbldg.Corp'n(Ltd.)
* Combustion Engineering Corp'n
* Schutte & Koerting Co.
* Spray Engineering Co.

Burners, Powdered Fuel
Grindle Fuel Equipment Co.
* Quigley Furnace Specialties Co.

Bushings, Bronze
* Wood's, T. B. Sons Co.

Cabinets and Tables, Blue Print Filing
Dietzgen, Eugene Co.
Economy Drawing Table & Mfg. Co.
Keuffel & Esser Co.
Manufacturing Equip. & Engrg. Co.
ParVell Laboratories
U. S. Blue Co.
Weber, F. Co. (Inc.)

Cableways, Excavating
Lidgerwood Mfg. Co.

Cableways, Hoisting and Conveying
Lidgerwood Mfg. Co.

Calorimeters
* American Schaeffer & Budenberg Corp'n
* Sarco Co. (Inc.)

Calorizing
Calorizing Co.

Cars, Charging
Easton Car & Construction Co.
* Whiting Corp'n

Cars, Industrial Railway
Easton Car & Construction Co.
Link-Belt Co.
* Whiting Corp'n

Cars, Trolley (Industrial Railway)
Link-Belt Co.

Casehardening
* American Metal Treatment Co.

Casings, Steel (Boiler)
* Brownell Co.
* Casey-Hedges Co.
* Vogt, Henry Machine Co.
* Walsh & Weidner Boiler Co.

Castings, Acid Resistant
* U. S. Cast Iron Pipe & Fdry. Co.

Castings, Aluminum
Buffalo Bronze Die Casting Corp'n
DuPont Engineering Co.

Castings, Brass
* Croll-Reynolds Engineering Co.
Du Pont Engineering Co.
* Edward Valve & Mfg. Co.

Castings, Bronze
Buffalo Bronze Die Casting Corp'n

Castings, Die-Molded
* Doehler Die-Casting Co.
Veeder Mfg. Co.

Castings, Heavy
Farrel Foundry & Machine Co.
* U. S. Cast Iron Pipe & Fdry. Co.

Castings, Iron
* Brown, A. & F. Co.
* Builders Iron Foundry
* Burhorn, Edwin Co.
* Casey-Hedges Co.
* Central Foundry Co.
Chain Belt Co.
* Cole, R. D. Mfg. Co.
* Croll-Reynolds Engineering Co.
DuPont Engineering Co.
* Falls Clutch & Machinery Co.
Farrel Foundry & Machine Co.
* Franklin Machine Co.
* Fuller-Lehigh Co.
Garlock Packing Co.
* Harrisburg Fdry. & Mach. Wks.
* Jones, W. A. Fdry. & Mach. Co.
Lidgerwood Mfg. Co.
Link-Belt Co.
* Nordberg Mfg. Co.
* Pittsburgh Valve, Fdry. & Const. Co.
* Royersford Fdry. & Mach. Co.
Treadwell Engineering Co.
* U. S. Cast Iron Pipe & Fdry. Co.
* Vogt, Henry Machine Co.

Castings, Monel Metal
Driver-Harris Co., (In Canada)
* Edward Valve & Mfg. Co.

Castings, Nichrome
Driver-Harris Co.

Castings, Nickle Chromium
Driver-Harris Co.

Castings, Semi-Steel
* Builders Iron Foundry
Chain Belt Co.
* Croll-Reynolds Engrg. Co. (Inc.)
Farrel Foundry & Machine Co.
Link-Belt Co.
* Nordberg Mfg. Co.
* Vogt, Henry Machine Co.

Castings, Steel
* Falk Corporation
Link-Belt Co.
Mackintosh-Hemphill Co.
* Reading Steel Casting Co. (Inc.) (Reading Valve & Fittings Div.)
Treadwell Engineering Co.

Castings, White Metal
* Doehler Die-Casting Co.

Cement, Asbestos
Carey, Philip Co.

Cement, Iron and Steel
Smooth-On Mfg. Co.

Cement, Pipe Joint
Smooth-On Mfg. Co.

Cement, Refractory
* Celite Products Co.
Johns-Manville (Inc.)
* King Refractories Co. (Inc.)
* Quigley Furnace Specialties Co.

Cement, Water-Resistant
Smooth-On Mfg. Co.

Cement Machinery
* Allis-Chalmers Mfg. Co.
* Fuller-Lehigh Co.
Link-Belt Co.
* Smidth, F. L. & Co.
* Worthington Pump & Machinery Corp'n

Centrifugals, Chemical
Tolhurst Machine Works

Centrifugals, Metal Drying
Tolhurst Machine Works

Centrifugals, Sugar
Fletcher Works
Tolhurst Machine Works
* Worthington Pump & Mchry. Corp'n

Chain Belts and Links
Chain Belt Co.
* Diamond Chain & Mfg. Co.
* Gifford-Wood Co.
* Jones, W. A. Fdry. & Mach. Co.
Link-Belt Co.
Union Chain & Mfg. Co.
* Whitney Mfg. Co.

Chains, Block
Reading Chain & Block Corp'n

Chains, Crane
Reading Chain & Block Corp'n

Chains, Power Transmission
Baldwin Chain & Mfg. Co
Chain Belt Co.
* Diamond Chain & Mfg. Co.
Link-Belt Co.
* Morse Chain Co.
Union Chain & Mfg. Co.
* Whitney Mfg. Co.

Charging Machines
* Whiting Corp'n

Chimneys, Brick (Radial)
Heine Chimney Co.
Morrison Boile Co.

Chimneys, Concrete
Heine Chimney Co.

Chucking Machines
* Jones & Lamson Machine Co
* Warner & Swasey Co.

Chucks, Drill
* S K F Industries (Inc.)
* Whitney Mfg. Co.

Chucks, Tapping
* Whitney Mfg. Co.

Chutes
Chain Belt Co.
* Gifford-Wood Co.
* Hendrick Mfg. Co.
Link-Belt Co.

Cigar Making Machinery
* American Machine & Foundry Co.

Cigarette Making Machinery
* American Machine & Foundry Co.

Circuit Breakers
* General Electric Co.
* Westinghouse Elec. & Mfg. Co.

Circulators, Feed Water
* Schutte & Koerting Co.

Circulators, Steam Heating
* Schutte & Koerting Co.

Cloth, Rubber
Garlock Packing Co.
* Goodrich, B. F. Rubber Co.

Cloth, Tracing
Dietzgen, Eugene Co.
Electro Sun Co. (Inc.)
Keuffel & Esser Co.
New York Blue Print Paper Co.
ParVell Laboratories
U. S. Blue Co.
Weber, F. Co. (Inc.)

Clutches, Friction
* Allis-Chalmers Mfg. Co.
* Brown A. & F. Co.
* Falls Clutch & Machinery Co.
Farrel Foundry & Machine Co.
Fletcher Works
* Gifford-Wood Co.
Johnson, Carlyle Machine Co.
* Jones, W. A. Fdry. & Mach. Co.
Link-Belt Co.
* Medart Co.
Philadelphia Gear Works
* Western Engineering & Mfg. Co.
* Wood's, T. B. Sons Co.

Coal
Pennsylvania Coal & Coke Co.

Coal Agitators
Ellis, W. E. Co.

Coal and Ash Handling Machinery
* Brown Hoisting Machinery Co.
Chain Belt Co.
* Gifford-Wood Co.
Link-Belt Co.

Coal Bins
* Brown Hoisting Machinery Co.
Chain Belt Co.
Link-Belt Co.

Coal Breakers and Cleaners
Pennsylvania Crusher Co.

Coal Mine Equipment and Supplies
* General Electric Co.

Coal Mining Machinery
* General Electric Co.
* Ingersoll-Rand Co.

Coal Preparing Equipment
Grindle Fuel Equipment Co.

Coaling Stations, Locomotive
Chain Belt Co.
* Gifford-Wood Co.
Link-Belt Co.

Coating (Metal Protecting)
* American Machine & Foundry Co.

Cocks, Air and Gage
* American Schaeffer & Budenberg Corp'n
* Ashton Valve Co.
* Crane Co.
* Jenkins Bros.
Lunkenheimer Co.
* Reading Steel Casting Co. (Inc.) (Pratt & Cady Division)
* Vogt, Henry Machine Co.

Cocks, Blow-off
* Crane Co.
Lunkenheimer Co.
* Pittsburgh Valve, Fdry. & Const. Co.
* Reading Steel Casting Co. (Inc.) (Pratt & Cady Division)

Cocks, Three-Way and Four-Way
* American Schaeffer & Budenberg Corp'n
* Crane Co.
* Crosby Steam Gage & Valve Co.
Lunkenheimer Co.
* Pittsburgh Valve, Fdry. & Const. Co.
* Reading Steel Casting Co. (Inc.) (Pratt & Cady Division)

Coils, Pipe
* Superheater Co
* Vilter Mfg. Co.
* Vogt, Henry Machine Co.

Coke
Pennsylvania Coal & Coke Co.

Cold Storage Plants
* De La Vergne Machine Co.

Collars, Shafting
Chain Belt Co.
Link-Belt Co.
* Medart Co.
* Royersford Fdry. & Mach. Co.
* Wood's, T. B. Sons Co.

Coloring (Metal)
* American Metal Treatment Co.

Combustion (CO_2) Recorders
* Sarco Co. (Inc.)
* Tagliabue, C. J. Mfg. Co.
* Uehling Instrument Co.

Compressors, Air
* Allis-Chalmers Mfg. Co.
* General Electric Co.
* Goulds Mfg. Co.
* Ingersoll-Rand Co.
Mackintosh-Hemphill Co.
* Nordberg Mfg. Co.
* Titusville Iron Works Co.
* Wayne Tank & Pump Co.
* Worthington Pump & Machinery Corp'n

Compressors, Air, Centrifugal
* De Laval Steam Turbine Co.
* General Electric Co.

Compressors, Air, Compound
* Ingersoll-Rand Co.
* Nordberg Mfg. Co.
* Worthington Pump & Machinery Corp'n

Compressors, Ammonia
* Frick Co. (Inc.)
* Ingersoll-Rand Co.
* Vilter Mfg. Co.
* Vogt, Henry Machine Co.
* Worthington Pump & Machinery Corp'n

Compressors, Gas
* De Laval Steam Turbine Co.
* General Electric Co.
* Ingersoll-Rand Co.
* Nordberg Mfg. Co.
* Worthington Pump & Machinery Corp'n

Condensers, Ammonia
* De La Vergne Machine Co.
* Frick Co. (Inc.)
* Ingersoll-Rand Co.
* Vilter Mfg. Co.
* Vogt, Henry Machine Co.

Condensers, Barometric
* Allis-Chalmers Mfg. Co.
Buffalo Steam Pump Co.
* Ingersoll-Rand Co.
* U. S. Cast Iron Pipe & Fdry. Co.
* Wheeler, C. H. Mfg. Co.
* Wheeler Condenser & Engrg. Co.
* Worthington Pump & Machinery Corp'n

Condensers, Jet
* Allis-Chalmers Mfg. Co.
Buffalo Steam Pump Co.
Elliott Co.
* Ingersoll-Rand Co.
* Nordberg Mfg. Co.
* Schutte & Koerting Co.
* Wheeler, C. H. Mfg. Co.
* Wheeler Condenser & Engrg. Co.
* Worthington Pump & Machinery Corp'n

Condensers, Surface
* Allis-Chalmers Mfg. Co.
Elliott Co.
* Ingersoll-Rand Co
* Nordberg Mfg. Co.
* Westinghouse Electric & Mfg. Co.
* Wheeler, C. H. Mfg. Co.
* Wheeler Condenser & Engrg. Co.
* Worthington Pump & Machinery Corp'n

Conduits
Johns-Manville (Inc.)

Controllers, Automatic, for Temperature or for Pressure
(See Regulators)

Controllers, Electric
* General Electric Co.
* Westinghouse Electric & Mfg. Co.

Controllers, Filter Rate
* Builders Iron Foundry
* Simplex Valve & Meter Co.

Controllers, Liquid Level
* Davis, G. M. Regulator Co.
* General Electric Co.
* Simplex Valve & Meter Co.
* Tagliabue, C. J. Mfg. Co.

Converters, Steel
* Whiting Corporation

Converters, Synchronous
* Allis-Chalmers Mfg. Co.
* General Electric Co.
* Westinghouse Electric & Mfg. Co.

Conveying Machinery
* Brown Hoisting Machinery Co.
Chain Belt Co.
* Gifford-Wood Co.
* Jones, W. A. Fdry. & Mach. Co.
Link-Belt Co.

Conveying Systems, Powdered Coal
Grindle Fuel Equipment Co.

Conveyor Systems, Pneumatic
* Allington & Curtis Mfg. Co.
* Sturtevant, B. F. Co.

Conveyors, Belt
* Brown Hoisting Machinery Co.
Chain Belt Co.
Gandy Belting Co.
* Gifford-Wood Co.
Link-Belt Co.

Conveyors, Bucket, Pan or Apron
* Brown Hoisting Machinery Co.
Chain Belt Co.
* Gifford-Wood Co.
* Jones, W. A. Fdry. & Mach. Co.
Link-Belt Co.

*Catalogue data of firms marked * appear in the A.S.M.E. Condensed Catalogues of Mechanical Equipment, 1923-24 Volume*

iron oxide had failed prematurely, a third lining low in iron oxide satisfactorily withstood disintegration on same furnace during 12-month campaign.

BOILER FEEDWATER

Temperature, Increasing. Effect of Increased Feed Water Temperature, J. R. Darnell. Power Plant Eng., vol. 28, no. 2, Jan. 15, 1924, pp. 131–132. Boiler efficiency is not increased by raising feedwater temperature; effect is to give boiler less work to do.

BOILER FURNACES

Air Preheaters for. Air Preheaters in Factories (Der Lufterhitzer in der Wärmewirtschaft des Fabrikbetriebes), L. Finckh. Wärme, vol. 46, no. 18, May 4, 1923, pp. 185–188, 3 figs. Increasing heat economy of factory through diverting flow of heat by means of air preheater; describes air preheater and its operation and gives results of official test.

Arch Design. Suspended Arches Gaining in Favor. Power Plant Eng., vol. 28, no. 1, Jan. 1, 1924, pp. 38–41, 10 figs. Proper ignition and combustion demand careful consideration of arch design; construction details.

Dampers. The Venetian Blind Damper. Eng. & Boiler House Rev., vol. 37, no. 5, Dec. 1923, p. 156, 1 fig. Describes damper, designed to overcome defects of ordinary sliding damper, in form of a Venetian blind having a number of movable horizontal shutters which can be adjusted with ease to regulate draft within very fine limits.

Design. Furnace Construction. Power Plant Eng., vol. 28, no. 1, Jan. 1, 1924, pp. 35–37, 4 figs. Notes on proportions, special baffling, arches and linings.

Grates. Rocking and Dumping Grates. Power Plant Eng., vol. 28, no. 1, Jan. 1, 1924, pp. 44–47, 11 figs. Principles of operation with general description and details of makes.

Lining. Improvements in Furnace Lining Material. Power Plant Eng., vol. 28, no. 1, Jan. 1, 1924, pp. 41–42, 2 figs. Methods used to reduce maintenance cost of linings.

Oil Burners. Burning Boiler Oil. Power, vol. 58, nos. 6, 8 and 10, Aug. 7, 21 and Sept. 4, 1923, pp. 209–211, 290–292 and 367–269, 24 figs. Aug. 7: Describes various types of burners. Aug. 21: Steam atomizers. Sept. 4: Mechanical burners.

Furnace Design Important in Burning Oil. Power Plant Eng., vol. 28, no. 1, Jan. 1, 1924, pp. 63–66, 11 figs. Furnace volume and amount of combustion air important factors; types of oil burners.

Smoke Preventer. An Automatic Smoke Preventing Apparatus. Power Engr., vol. 19, no. 214, Jan. 1924, pp. 27–28, 3 figs. Device for prevention of smoke from Lancashire and Cornish-type boilers.

Turbine. The Modern Turbine Furnace. Eng. & Boiler House Rev., vol. 37, nos. 5 and 6, Dec. 1923, and Jan. 1924, pp. 149–150 and 152 and 198–200, 8 figs. Scientific principles underlying design and working of most modern type of steam-jet furnace as represented by installation of Turbine Furnace Co., Ltd., London.

Wood-Waste-Burning. Furnaces for Burning Wood Refuse. Power Plant Eng., vol. 28, no. 1, Jan. 1, 1924, pp. 68–70, 7 figs. Difficulties encountered in burning refuse from woodworking plants and principles governing furnace design.

BOILER OPERATION

Draft Regulation. Draft and Its Relation to Combustion, R. S. Hawley. Combustion, vol. 9, no. 6, Dec. 1923, pp. 456 and 462. Points out that amount of draft which given boiler should have is dependent upon conditions of load, overload, type of furnace, grate and boiler, and kind and nature of fuel used.

Instruments for. The value of Instruments for High-Grade Boiler-Room Operation, H. H. Bates. Power, vol. 58, no. 25, Dec. 18, 1923, pp. 988–989. Discusses use of instruments, including summary of boiler conditions and their symptoms or characteristics as indicated by meters.

Regulations for. Regulations for the Operation of Boiler Plants (Betriebsvorschriften für Dampfkesselanlagen), H. Guilleaume. Zeit. des Vereines deutscher Ingenieure, vol. 67, no. 50, Dec. 15, 1923, pp. 1122–1126. Discusses regulations for care and attendance of boilers in operation.

BOILER PLANTS

Boston Elevated Ry. Plant of the Boston Elevated Railway Co. Combustion, vol. 9, no. 6, Dec. 1923, pp. 466–469, 5 figs. Details of two new Babcock & Wilson cross-drum boilers installed in South Boston plant, under which are installed two new Frederick super-station stokers of 13 retorts each.

Improvements. Improvements in Steam Practice as Accomplished at Lukens Steel Company, G. D. Spackman. Assn. Iron & Steel Elec. Engrs., vol. 5, no. 12, Dec. 1923, pp. 659–679 and (discussion) 679–693, 8 figs. Describes changes made and savings effected.

BOILERS

Cracks. Boiler-Plate Cracks and Means of Preventing Them (Blechschäden an Dampfkesseln und Mittel zu ihrer Verhütung), F. Loch. Zeit. des Vereines deutscher Ingenieure, vol. 67, no. 50, Dec. 15, 1923, pp. 1114–1116, 5 figs. Cause of crack formation in rivet seams of boilers; recommendations for testing of boiler plate; rivet tests and confirmation of correctness of maximum pressures in hydraulic riveting established by Bach and Baumann; improved vertical-tube boilers.

Developments 1923. Boilers and Boiler Auxiliaries. Power, vol. 59, no. 1, Jan. 1, 1924, pp. 6–9. Foreign designs for high pressure; use of electric boilers increasing; developments in radiant heat; large combustion space favored; economy of stage bleeding; new instruments.

Equipment. Boiler Equipment. Power Plant Eng., vol. 28, no. 1, Jan. 1, 1924, Includes following articles: Description of Standard Types of Water Columns, Steam Gages, Fusible Plugs, Safety Valves, Steam Outlet Valves and Blowoff Valves, pp. 73–76, 9 figs.; Types and Details of Safety Valves, pp. 76–79, 10 figs.; Steam Outlet and Blowoff Valves, pp. 79–85, 22 figs.

Feeding. The Ideal Boiler Feeding and Its Realization (Die ideale Kesselspeisung und ihre Verwirklichung), H. Schierenbeck. Archiv für Wärmewirtschaft, vol. 4, no. 12, Dec. 1923, pp. 209–212, 9 figs. Disadvantages of usual methods; basic principles for automatic regulation of boiler feeding; advantages of regulator and field of application.

Horizontal Return Tubular. Horizontal Return Tubular Boilers. Power Plant Eng., vol. 28, no. 1, Jan. 1, 1924, pp. 19–21, 2 figs. Due to influence of standardization selection depends largely upon boiler-shop practice. See also article entitled, Setting the Horizontal Return Tubular Boiler, pp. 21–23, 4 figs.

Ignition Arches in. Ignition Arches in Flame Tube Boilers (Die Einwirkung von Zündgewölben in Flammrohrkesseln), M. Schimpf. Glückauf, vol. 59, no. 47, Nov. 24, 1923, pp. 1057–1059, 2 figs. Gives test data relating to a Lancashire-type boiler with 100.5-sq. m. heating surface and 3.23-sq. m. grate area; it was found that addition of three ignition arches reduced amount of smoke formed and increased efficiency of boiler by 6.4 per cent.

Injuries to. Boiler Damages (Kesselschäden), R. Baumann. Zeit. des Vereines deutscher Ingenieure, vol. 67, no. 50, Dec.15, 1923, pp. 1109–1113, 21 figs. Discusses possible causes of boiler damage, with regard to materials, construction and operation, and taking into consideration too rapid development of boilers for continually increasing pressures (temperatures) and larger dimensions; problem of life of boiler.

Inspection. Inspection of Boiler Construction (Ausführung der Bauüberwachung), H. Bracht. Zeit. des Vereines deutscher Ingenieure, vol. 67, no. 50, Dec. 15, 1923, pp. 1120–1122. Rules for inspection.

Locomotive. See LOCOMOTIVE BOILERS.

Marine. See MARINE BOILERS.

Mercury-Vapor. Mercury Boiler in Successful Operation. Power Plant Eng., vol. 28, no. 2, Jan. 15, 1924, pp. 136–138, 5 figs. Combination mercury and steam cycle shows remarkable savings at Hartford Elec. Light Co. plant.

Parts, Strength of. Strength of Boiler Parts. Power Plant Eng., vol. 28, no. 1, Jan. 1, 1924, pp. 30–34, 6 figs. Strength of riveted joints; welded joints; heads and stays in boiler shells; boiler tubes; steam nozzles.

Piping. Boiler Piping Arrangements. Power Plant Eng., vol. 28, no. 1, Jan. 1, 1924, pp. 86–88, 4 figs. Feedwater, blowoff, drip and drain safety valve and steam piping. See also article entitled, Safety First Should be Feature of Boiler Piping, pp. 88–89, 2 figs.

Testing Codes. The Need of an Efficient Boiler Testing Code, David Brownlie. Eng. & Boiler House Rev., vol. 37, no. 5, Dec. 1923, pp. 143–144 and 147. Deals with main points, both in criticism of existing codes and from point of view of suggestions for a new code.

Vertical, Tubular. Adaptability of Vertical Tubular Boilers. Power Plant Eng., vol. 28, no. 1, Jan. 1, 1923, pp. 24–26, 5 figs. Suited for installations where compactness and low first cost are of prime importance.

Wadurf, Tests of. Tests with the Wadurf Boiler (Versuche mit dem Wadurf-Kessel), P. Zwiauer. Zeit. des Vereines deutscher Ingenieure, vol. 67, no. 50, Dec. 15, 1923, pp. 1117–1119, 3 figs. Results of tests carried out on boiler of original design for long-distance heat transmission and smokeless firing.

Waste-Heat. Waste-Heat Boilers, C. H. Bamber. Gas World, vol. 79, no. 2056, Dec. 15, 1923, pp. 546–550 (includes discussion). Discusses validity of some of the claims made for these boilers; waste-heat versus solid fuel, or convection versus radiation; design; water-tube boiler for waste heat; fire-tube boiler; heat available from vertical retorts; chimney temperature and natural draft; etc. Paper read before Manchester and District Jr. Gas Assn.

Water-Tube. See BOILERS, WATER-TUBE.

BOILERS, WATER-TUBE

Construction. Water-tube Boilers, C. C. Pounder. Mech. World, vol. 74, nos. 1916, 1918, 1921, 1927 and 1930, Sept. 21, Oct. 5, 26, Dec. 7 and 28, 1923, pp. 178, 212–213, 360, 358–359, and 405, 16 figs. Characteristics and construction of different types.

Hanomag. High-Power Boilers (Hochleistungs-Dampfkessel), F. Wilcke. Praktischer Maschinen-Konstrukteur, vol. 56, no. 38–39, Oct. 2, 1923, 3 pp., 2 figs. Details of Hanomag vertical-tube boiler for pressures up to 35 atmos.; results of tests with lignite, briquette and anthracite firing.

Standard American. Details of Standard Water-Tube Boilers. Power Plant Eng., vol. 28, no. 1, Jan. 1, 1924, pp. 7–18, 36 figs. Descriptions and illustrations showing best practice of modern American design and construction.

BONUS SYSTEMS

Practical Application. Applying the Bonus System to Diversified Operations, Chas. E. Bassett. Indus. Management (N. Y.), vol. 67, no. 1, Jan. 1924, pp. 47–51, 5 figs. Practical wage-incentive plant.

BRAKES

Air. The Evolution of Air Brakes for Steam Road Service, G. Terwilliger. New England R. R. Club, Dec. 11, 1923, pp. 179–190 and (discussion) 190–207. History and principal operating advantages incident to the various stages of development.

BRASS

Finishes. Popular Surface Finishes for Brass. Metal Industry (Lond.), vol. 23, no. 26, Dec. 28, 1923, pp. 577–578. Notes on "primrose," satin, oxidized silver, and irridescent finish.

BUSES

Trolley. Trolley Omnibus System in Wolverhampton (Eng.). Tramway & Ry. World, vol. 54, no. 30, Dec. 20, 1923, pp. 318–322, 15 figs. Advantages of adopting trolley omnibus system of traction on Wednesfield route; details of chassis of bus adopted, which was designed to carry load of 5 tons including car body.

C

CALORIMETERS

Throttling. The Throttling Calorimeter, Thos. M. Gunn. Power, vol. 58, no. 26, Dec. 25, 1923, pp. 1023–1024, 2 figs. Simple explanation of how it works, how it is used, and how it is made.

CAR LIGHTING

Efficient. Railway Car Lighting, G. E. Hulse. Illuminating Eng. Soc.—Trans., vol. 18, no. 8, Oct. 1923, pp. 748–762. Limitations encountered in problem of supplying illumination to cars; means of lighting; standardization of car illumination; coach-lighting tests of 1913; arrangement of fixtures for various types of cars, and resulting illumination; types of glassware used and efficiency of installation with this glassware.

CAR WHEELS

Chilled-Iron. Making Car Wheels in Railroad Shops. Ry. Jl., vol. 29, no. 12, Dec. 1923, pp. 24–27, 6 figs. Describes work done in foundry of Norfolk & Western shops at Roanoke, Va., in making chilled cast-iron car wheels.

Steel, Wrought. Wrought Steel Wheels for Car and Tender Service, A. Knapp. Car Foremen's Assn. of Chicago—Proc., vol. 18, no. 3, Dec. 1923, pp. 19–22, 25–28 and (discussion) 28, 31–32, 35–36, 39–40 and 43–44. Outline of directions being prepared to issue to N. Y. Central Lines to assist car and motive-power departments to conform to recommendations of Am. Ry. Assn. referring to maintenance of wrought-steel wheel tread and flange contours; use of new wheel gage.

CARBON DIOXIDE

Properties. Properties of Carbon Dioxide, Chas. H. Herter. Refrig. World, vol. 58, nos. 9 and 10, Sept. and Oct. 1923, pp. 13–16 and 36, and 13–15, 1 fig. Latest tables on CO_2, and explanation thereof.

CARS, FREIGHT

Logging, Steel-Frame. 50-Ton Capacity Steel Frame Logging Car. Ry. Rev., vol. 73, no. 24, Dec. 15, 1923, pp. 853–854, 4 figs. Design for Trinity County Lumber Co. embodies original feature in arrangement of metal bunks and stakes.

Mass Production. Mass Production of Railway Wagons. Engineer, vol. 136, no. 3548, Dec. 28, 1923, pp. 697–700, 10 figs. Describes plant, methods and equipment at Derby works of Lond., Midland & Scottish Ry. See also Engineering, vol. 116, no. 3026, Dec. 28, 1923, pp. 797–891, 15 figs.

Production Statistics, 1923. Freight Car Increase Breaks All Records. Ry. Age, vol. 76, no. 1, Jan. 5, 1924, pp. 87–93, 1 fig. Railroads devoted 39 per cent of all 1923 capital expenditures to freight cars; gives table of orders in 1923 for service in United States.

CARS, PASSENGER

Production Statistics, 1923. Large Progress in Passenger Car Acquisitions. Ry. Age, vol. 76, no. 1, Jan. 5, 1924, pp. 83–86, 1 fig. Orders less than in 1922 but otherwise largest since 1916; production largest since 1917; gives table of orders in 1923 for service in United States.

Sleepers. New Canadian National Sleeping Cars. Ry. Mech. Engr., vol. 98, no. 1, Jan. 1924, pp. 27–30, 5 figs. Also Ry. Age, vol. 76, no. 2, Jan. 12, 1924, pp. 189–190, 5 figs. Distinctive floor plan arrangement; frame and exterior of steel; interior finished with wood.

CASE-HARDENING

Localized. Local Surface Hardening. English Mechanics, vol. 118, no. 3064, Dec. 14, 1923, p. 297, 4 figs. Makes reference to one or two existing practical methods of local case-hardening, and describes Vickers local hardening process.

Methods and Applications. Case-Hardening (Ueber Einsatzhärtung), H. Graefe. Maschinenbau, vol. 2, no. 23, Aug. 22, 1923, pp. B265–B274, 26 figs. Properties of charge; alloyed and unalloyed material; testing charge powder; packing; testing of inserted pieces; practical examples.

CAST IRON

Mass Effect. Cast Iron and Mass Effect, O. Smalley. Metal Industry (Lond.), vol. 23, nos. 24 and 25, Dec. 14 and 21, 1923, pp. 541–542 and 561–565, 10 figs. Discusses time factor for various sections of cast iron to solidify under known conditions; effect of chemical composition on solidity; penetrating power of gray cast iron; relation between chemical and structural changes as effected by time and temperature, adoption of some simple standard of solidity; effect of design on strength in normal castings; and rate of running to mass effect and its possibilities and limitations in application to manufacture of solid castings without risers. Abridgement of paper read before Int. Convention of Foundrymen in Paris.

Physical Tests. Physical Tests for Grey Iron, J. Shaw. Engineering, vol. 116, no. 3024, Dec. 14

Manufactured by Advertisers — CLASSIFIED LIST OF MECHANICAL EQUIPMENT — Alphabetical List on page 156

Conveyors, Chain
* Brown Hoisting Machinery Co.
Chain Belt Co.
Link-Belt Co.

Conveyors, Ice
Chain Belt Co.
* Gifford-Wood Co.
Link-Belt Co.

Conveyors, Portable
* Gifford-Wood Co.
Link-Belt Co.

Conveyors, Screw
Chain Belt Co.
* Gifford-Wood Co.
Link-Belt Co.

Cooling Ponds, Spray
* Cooling Tower Co. (Inc.)
* Schutte & Koerting Co.
* Spray Engineering Co.

Cooling Towers
* Burhorn, Edwin Co.
* Cooling Tower Co. (Inc.)
* Spray Engineering Co.
* Wheeler, C. H. Mfg. Co.
* Worthington Pump & Machinery Corp'n

Copper, Drawn
* Roebling's, John A. Sons Co.

Copper Converting Machinery
* Allis-Chalmers Mfg. Co.
* Worthington Pump & Machinery Corp'n

Counters, Revolution
* American Schaeffer & Budenberg Corp'n
* Ashton Valve Co.
* Bristol Co.
* Crosby Steam Gage & Valve Co.
Veeder Mfg. Co.

Countershafts
* Builders Iron Foundry
* Royersford Fdry. & Mach. Co.
* Wood's, T. B. Sons Co.

Couplings, Pipe
Byers, A. M. Company
* Central Foundry Co.
* Crane Co.
Lunkenheimer Co.

Coupling, Shaft (Flexible)
* Allis-Chalmers Mfg. Co.
* Brown, A. & F. Co.
* Falk Corporation
* Fawcus Machine Co.
* Jones, W. A. Fdry. & Mach. Co.
* Medart Co.
* Nordberg Mfg. Co.
* Smith & Serrell

Coupling, Shaft (Rigid)
* Allis-Chalmers Mfg. Co.
* Brown, A. & F. Co.
Chain Belt Co.
Cumberland Steel Co.
* Falls Clutch & Machinery Co.
Farrel Foundry & Machine Co.
* General Electric Co.
* Jones, W. A. Fdry. & Mach. Co.
Link-Belt Co.
* Medart Co.
* Royersford Fdry. & Mach. Co.
* Smith & Serrell
* Wood's, T. B. Sons Co.

Couplings, Universal Joint
* Wood's, T. B Sons Co.

Coverings, Steam Pipe
Carey, Philip Co.
Johns-Manville (Inc.)

Cranes, Electric Traveling
Northern Engineering Works
* Whiting Corporation

Cranes, Floor (Portable)
Lidgerwood Mfg. Co.

Cranes, Gantry
* Brown Hoisting Machinery Co.
Link-Belt Co.
Northern Engineering Works
* Whiting Corp'n

Cranes, Hand Power
* Brown Hoisting Machinery Co.
Clyde Iron Works Sales Co.
Northern Engineering Works
* Whiting Corp'n

Cranes, Jib
* Brown Hoisting Machinery Co.
Northern Engineering Works
* Whiting Corp'n

Cranes, Locomotive
* Brown Hoisting Machinery Co.
Link-Belt Co.

Cranes, Locomotive (Crawler)
Link-Belt Co.

Cranes, Pillar
* Brown Hoisting Machinery Co.
Northern Engineering Works
* Whiting Corp'n

Cranes, Portable
* Brown Hoisting Machinery Co.
Clyde Iron Works Sales Co.
Link-Belt Co.

Crucibles, Graphite
Dixon, Joseph Crucible Co.

Crushers, Clinker
Farrel Foundry & Machine Co.

Crushers, Coal
* Allis-Chalmers Mfg. Co.
* Brown Hoisting Machinery Co.
* Fuller-Lehigh Co.
* Gifford-Wood Co.
Link-Belt Co.
Pennsylvania Crusher Co.
* Smidth, F. L. & Co.
* Worthington Pump & Machinery Corp'n

Crushers, Hammer
Pennsylvania Crusher Co.

Crushers, Jaw
Farrel Foundry & Machine Co.
* Worthington Pump & Machinery Corp'n

Crushers, Ore and Rock
Farrel Foundry & Machine Co.
* Nordberg Mfg. Co.
Pennsylvania Crusher Co.

Crushers, Roll
Link-Belt Co.
Pennsylvania Crusher Co.
* Worthington Pump & Machinery Corp'n

Crushing and Grinding Machinery
* Allis-Chalmers Mfg. Co.
Farrel Foundry & Machine Co.
* Fuller-Lehigh Co.
Pennsylvania Crusher Co.
* Smidth, F. L. & Co.
* Worthington Pump & Machinery Corpn'

Cupolas
* Bigelow Co.
Northern Engineering Works
* Whiting Corp'n

Cutters, Bolt
* Landis Machine Co. (Inc.)

Cutters, Milling
* Whitney Mfg. Co.

Dehumidifying Apparatus
* American Blower Co.
* Carrier Engineering Corp'n

Derricks and Derrick Fittings
Clyde Iron Works Sales Co.
Lidgerwood Mfg. Co.

Diaphragms, Rubber
* United States Rubber Co.

Die Castings
(See Castings, Die Molded)

Die Heads, Thread Cutting (Self-opening)
* Jones & Lamson Machine Co.
* Landis Machine Co. (Inc.)

Dies, Blanking
* Geuder, Paeschke & Frey Co.

Dies, Drawing
* Geuder, Paeschke & Frey Co.

Dies, Punching
* Geuder, Paeschke & Frey Co.
* Niagara Machine & Tool Works

Dies, Sheet Metal Working
* Niagara Machine & Tool Works

Dies, Stamping
* Geuder, Paeschke & Frey Co.
* Niagara Machine & Tool Works

Dies, Thread Cutting
* Jones & Lamson Machine Co.
* Landis Machine Co. (Inc.)

Diesel Engines
(See Engines, Oil, Diesel)

Digesters
* Bigelow Co.

Distilling Apparatus
* Vogt, Henry Machine Co.

Drafting Room Furniture
Dietzgen, Eugene Co.
Economy Drawing Table & Mfg. Co.
Keuffel & Esser Co.
New York Blue Print Paper Co.
ParVell Laboratories
U. S. Blue Co.
Weber, F. Co. (Inc.)

Drawing Instruments and Materials
Dietzgen, Eugene Co.
Electro Sun Co. (Inc.)
Keuffel & Esser Co.
New York Blue Print Paper Co.
ParVell Laboratories
U. S. Blue Co.
Weber, F. Co. (Inc.)

Dredges, Hydraulic
* Morris Machine Works

Dredging Machinery
Lidgerwood Mfg. Co.
* Morris Machine Works

Dredging Sleeve
* United States Rubber Co.

Drilling Machines, Sensitive
* Royersford Fdry. & Mach. Co.

Drilling Machines, Vertical
* Royersford Fdry. & Mach. Co.

Drills, Coal and Slate
* General Electric Co.
* Ingersoll-Rand Co.

Drills, Core
* Ingersoll-Rand Co.

Drills, Rock
* General Electric Co.
* Ingersoll-Rand Co.

Drinking Fountains, Sanitary
Johns-Manville (Inc.)
Manufacturing Equip. & Engrg. Co.
Murdock Mfg. & Supply Co.

Dryers, Coal
Grindle Fuel Equipment Co.

Dryers, Rotary
* Bigelow Co.
Farrel Foundry & Machine Co.
* Fuller-Lehigh Co.
Link-Belt Co.
* Sturtevant, B. F. Co.

Drying Apparatus
* American Blower Co.
* Carrier Engineering Corp'n
* Clarage Fan Co.
Philadelphia Drying Mchry. Co.
* Sturtevant, B. F. Co.

Dust Collecting Systems
* Allington & Curtis Mfg. Co.
* Allis-Chalmers Mfg. Co.
* Clarage Fan Co.
* Sturtevant, B. F. Co.

Dust Collectors
* Allington & Curtis Mfg. Co.
* Allis-Chalmers Mfg. Co.
* Sturtevant, B. F. Co.

Dyeing Machinery
Philadelphia Drying Mchry. Co.

Dynamometers
* American Schaeffer & Budenberg Corp'n
* General Electric Co.
* Wheeler, C. H. Mfg. Co.

Economizers, Fuel
* Green Fuel Economizer Co.
* Sturtevant, B. F. Co.

Ejectors
* Schutte & Koerting Co.

Electrical Machinery
* Allis-Chalmers Mfg. Co.
* General Electric Co.
* Westinghouse Electric & Mfg. Co.

Electrical Supplies
* General Electric Co.
Johns-Manville (Inc.)

Elevating and Conveying Machinery
* Brown Hoisting Machinery Co.
Chain Belt Co.
* Gifford-Wood Co.
* Jones, W. A. Fdry. & Mach. Co.
Link-Belt Co.

Elevators, Bucket & Chain
Gandy Belting Co.

Elevators, Electric
* American Machine & Foundry Co.
Northern Engineering Works

Elevators, Hydraulic
* Whiting Corp'n

Elevators Passenger and Freight
Northern Engineering Works

Elevators, Pneumatic
* Whiting Corp'n

Elevators, Portable
* Gifford-Wood Co.
Link-Belt Co.

Elevators, Telescopic
Link-Belt Co.

Emery Wheel Dressers
* Builders Iron Foundry

Engine Repairs
* Franklin Machine Co.
* Nordberg Mfg. Co.

Engine Stops
* Schutte & Koerting Co.

Engines, Blowing
* Allis-Chalmers Mfg. Co.
Mackintosh-Hemphill Co.
* Nordberg Mfg. Co.
* Worthington Pump & Machinery Corp'n

Engines, Gas
* Allis-Chalmers Mfg. Co.
* De La Vergne Machine Co.
* Ingersoll-Rand Co.
Otto Engine Works
Sterling Engine Co.
* Titusville Iron Works Co.
* Westinghouse Electric & Mfg. Co.

Engines, Gasoline
Otto Engine Works
Sterling Engine Co.
* Sturtevant, B. F. Co.
* Titusville Iron Works Co.
* Worthington Pump & Machinery Corp'n

Engines, Hoisting
* Allis-Chalmers Mfg. Co.
Clyde Iron Works Sales Co.
Lidgerwood Mfg. Co.
* Morris Machine Works
* Nordberg Mfg. Co.

Engines, Kerosene
* Worthington Pump & Machinery Corp'n

Engines, Marine
* Ingersoll-Rand Co.
Johnson, Carlyle Machine Co.
* Nordberg Mfg. Co.
Sterling Engine Co.
* Sturtevant, B. F. Co.
* Ward, Chas. Engineering Works
* Worthington Pump & Machinery Corp'n

Engines, Marine, Oil
* Ingersoll-Rand Co.
* Nordberg Mfg. Co.

Engines, Marine, Steam
* Nordberg Mfg. Co.

Engines, Oil
* Allis-Chalmers Mfg. Co.
* De La Vergne Machine Co.
* Ingersoll-Rand Co.
* Nordberg Mfg. Co.
Otto Engine Works
* Titusville Iron Works Co.
* Worthington Pump & Machinery Corp'n

Engines, Oil, Diesel
* Allis-Chalmers Mfg. Co.
* Nordberg Mfg. Co.
* Worthington Pump & Machinery Corp'n

Engines, Pumping
* Allis-Chalmers Mfg. Co.
* Ingersoll-Rand Co.
* Morris Machine Works
* Nordberg Mfg. Co.
Sterling Engine Co.
* Worthington Pump & Machinery Corp'n

Engines, Steam
* Allis-Chalmers Mfg. Co.
* American Blower Co.
* Brownell Co.
* Clarage Fan Co.
Clyde Iron Works Sales Co.
* Cole, R. D. Mfg. Co.
* Erie City Iron Works
* Harrisburg Fdry. & Mach. Wks.
* Ingersoll-Rand Co.
* Leffel, James & Co.
Lidgerwood Mfg. Co.
Mackintosh-Hemphill Co.
* Morris Machine Works
* Nordberg Mfg. Co.
Ridgway Dynamo & Engine Co.
* Sturtevant, B. F. Co.
* Titusville Iron Works Co.
* Troy Engine & Machine Co.
* Vilter Mfg. Co.
* Westinghouse Electric & Mfg. Co.
* Wheeler, C. H. Mfg. Co.

Engines, Steam, Automatic
* American Blower Co.
* Brownell Co.
* Clarage Fan Co.
* Erie City Iron Works
* Harrisburg Fdry. & Mach. Wks.
* Leffel, James & Co.
* Sturtevant, B. F. Co.
* Troy Engine & Machine Co.
* Westinghouse Electric & Mfg. Co.

Engines, Steam, Corliss
* Allis-Chalmers Mfg. Co.
* Franklin Machine Co.
* Frick Co. (Inc.)
* Harrisburg Fdry. & Mach. Wks.
Mackintosh-Hemphill Co.
* Nordberg Mfg. Co.
* Vilter Mfg. Co.

Engine, Steam, High Speed
* American Blower Co.
* Brownell Co.

*Catalogue data of firms marked * appear in the A.S.M.E. Condensed Catalogues of Mechanical Equipment, 1923-24 Volume*

1923, pp. 755–756, 2 figs. Discusss inadequacy of present-day analyses. Paper read before Sheffield Assn. of Metallurgists and Met. Chemists.

CASTING

Centrifugal. Centrifugal Casting Machines Now a Reality, A. W. Cowper. Can. Foundryman, vol. 14, no. 12, Dec. 1923, pp. 24 and 26. Deals with aspects of centrifugal casting process as applied to production of cast iron castings.

CASTINGS

Large, Breaking up. Breaking up Large Castings. Practical Engr., vol. 68, no. 1920, Dec. 13, 1923, pp. 328–329, 2 figs. Hints on use of explosives for breaking up large castings for scrap, for demolishing concrete foundations and other massive material. Abstracted from booklet issued by Nobel Industries.

CENTRAL STATIONS

Desuperheater and Attemporator. Desuperheater and Attemporator, H. W. Brooks. Power, vol. 58, no. 25, Dec. 18, 1923, pp. 992–993, 5 figs. Special feature of remodeled Batavia electric-railroad plant.

Improvements. Advances in Power Station Practice, E. M. Hollingsworth. Instn. Elec. Engrs.—Jl., vol. 62, no. 324, Dec. 1923, pp. 31–36. Survey of improvements in application of higher steam pressures and temperatures; more satisfactory treatment and heating of feedwater; increased speed of turbo-generators for given output; and stage reheating of steam. Chairman's address.

Metropolitan Edison Co., Middletown, Pa. Metropolitan Edison Company's Middletown Plant. Power, vol. 58, no. 26, Dec. 25, 1923, pp. 1026–1027, 2 figs. Plant laid out for 200,000-kw. capacity in six units; boiler to be fired with powdered coal.

Oil-Engine Electric-Light. An Efficient Oil Engine Light Plant, Ray C. Burrus. Power, vol. 58, no. 26, Dec. 25, 1923, pp. 1016–1020, 7 figs. Describes municipally owned electric-light plant at South River, N. J.

Remodeling. Remodeling Electric Railway Plant at Batavia, Illinois, H. W. Brooks. Power, vol. 58, no. 18, Oct. 30, 1923, pp. 678–682, 6 figs. Plant installed 22 years ago was modernized and all equipment put in such good operating conditions as to effect reduction in coal consumption of 20 per cent and maintenance costs by same ratio.

Sites, Selection of. The Best Site for a Power Station, Alex. Russell. Instn. Elec. Engrs.—Jl., vol. 62, no. 324, Dec. 1923, pp. 12–13, 1 fig. Points out that in considering best site for power station it is helpful to know position of site for which copper required for feeder mains would be a minimum; other factors which must be taken into account. Part of inaugural address.

Waukegan, Ill. New Waukegan Power Station. Power, vol. 59, no. 3, Jan. 15, 1924, pp. 80–86, 11 figs. First unit of 250,000-kw. base-load plant; boilers designed for 400 lb. and 700 deg.; a. c. stoker drive arranged for 40 speeds; coal-handling and feedwater systems; data on mechanical and electrical equipment. See also Power Plant Eng., vol. 28, no. 2, Jan. 15, 1924, pp. 119–126, 8 figs.

Waukegan 400-Lb. Plant Operating. Elec. World, vol. 83, no. 2, Jan. 12, 1924, pp. 78–86, 22 figs. High pressure a feature of new generating station on system of Public Service Co. of Northern Illinois; ultimate rating may be 250,000 kw. or more; mechanical and electrical features.

CHAIN DRIVE

Sprockets. Remedying Faults in Sprockets, John S. Watts. Machy. (N. Y.), vol. 30, no. 5, Jan. 1924, pp. 350–351, 2 figs. Effect of changing pitch of driver and of follower; advantages gained by change in pitch; improved sprocket design.

CHIMNEYS

Calculation. The Static Calculation of Steel Chimneys for Factories (Die statische Berechnung eiserner Fabrikschornsteine), P. Stephan. Praktischer Maschinen-Konstrukteur, vol. 56, nos. 32–33 and 34–35, Aug. 21 and Sept. 4, 1923, 2 and 4 pp., 9 figs. Gives two examples of numerical calculation.

CHROME STEEL

Hardness. Secondary Hardness in Austenitized High Chromium Steels, Edgar C. Bain. Am. Soc. Steel Treating—Trans., vol. 5, no. 1, Jan. 1924, pp. 89–101 and (discussion) 101–105, 14 figs. Summary of hardness measurements made with Rockwell hardness tester on four grades of high-carbon, high-chrome steel with variety of quenches and series of draws; sample tools made from these steels in which secondary hardness had been developed after having been quenched austenitic gave results in cutting speed between that of carbon steel and high-speed steel.

COAL

Purchasing and Inspection. An Effective Method for Keeping Fuel Costs within Bounds, G. Milton Levy. Factory, vol. 32, no. 1, Jan. 1924, pp. 40–42, 2 figs. It has been found that by compositing coal by shippers, it is possible to determine quality of coal shipped from various mines and when unsatisfactory, shipments from that mine can be cancelled; presents chart showing results of this inspection over period of year.

Relative Steaming Values. Value of Coke, Anthracite, and Bituminous Coal for Generating Steam in a Low-Pressure Cast-Iron Boiler, J. Blizard, J. Neil and F. C. Houghten. U. S. Bur. Mines, Technical Paper 303, 1922, 56 pp., 22 figs. Description of tests carried out, and results obtained, to determine relative steaming values of coke, anthracite, and bituminous coal when burned in a low-pressure boiler, and fired by hand in fairly large quantities at a time; to separate heat losses and examine them; to determine change in efficiency with method of firing fuel and manipulation of draft dampers, with rate of evaporation, and with various fuels burned; and to determine other factors affecting operation of boiler.

COAL HANDLING

Conveyors. Coal-Conveyors, W. G. Burt. Min. Inst. Scotland—Trans., vol. 44, Part 4, Oct. 13, 1923, pp. 136–138 and (discussion) 138–142. Details of working costs and conditions of Blackett and shaker or jigger conveyors, which are of constant-delivery type, and of Thomson conveyor, which is of intermittent-delivery type.

Loading Plants. Modern Coal-Loading Plants (Neuzeitliche Kohlenverladeanlagen), G. Fiala. Maschinenbau, vol. 2, no. 24, Sept. 15, 1923, pp. G264–G267, 7 figs. Describes new type of automatic plant for boiler coaling with automatic unloading bucket, counterweight and electric control, and points out its advantages over older types.

Piers. Electrically Operated Coal Pier of Western Maryland Railway Co. Eng. World, vol. 23, no. 6, Dec. 1923, pp. 359–363, 8 figs. Construction data; operation of pier, including equipment.

Steam-Generating Station. Coal Handling at Zilwaukee, H. F. Eddy. Elec. World, vol. 82, no. 26, Dec. 29, 1923, pp. 1314–1316, 3 figs. Avoidance of great investment and costly attendance governed selection and arrangement of coal-handling equipment.

COAL STORAGE

Advisability of. Is Coal Storage Worth While? Power, vol. 59, no. 2, Jan. 8, 1924, pp. 42–44, 7 figs. Points out that regular systematic, large-scale storage of coal by consumers during seasons of low consumption is public's largest opportunity and responsibility in solving coal problem.

Bituminous Coal. The Storage of Bituminous Coal, W. L. Abbott. Indus. Management (Lond.), vol. 10, no. 11, Nov. 29, 1923, pp. 313–314. Notes on degradation of coal due to weather and handling, and means of preventing it. Author advises shutting down of superfluous coal mines.

Economical Systems. Some Methods of Storing Coal. Power, vol. 59, no. 3, Jan. 15, 1923, pp. 96–98, 6 figs. Discusses several low-priced systems of coal handling and storing.

COLD STORAGE

Meat. Large Meat Cold Storage at Bremerhaven Germany, M. Hirsch. Ice & Refrigeration, vol. 65, no. 6, Dec. 1923, pp. 358–361, 9 figs. Description of cold-storage building and equipment, material-handling system, and power plant; details of equipment in boiler house, engine room, and refrigerating plant; reliability and efficiency of plant.

COMBUSTION

Products, Properties of. Properties of the Products of Combustion, Rich. Brown. Combustion, vol. 9, no. 6, Dec. 1923, pp. 451–455, 5 figs. Presents charts for computation of temperature, excess air, B.t.u., weight, volume, and components of gas analysis.

COMPRESSED AIR

Use in Speeding Production. Compressed Air Speeds Superheater Production, F. A. Maclean. Can. Machy., vol. 30, no. 26, Dec. 27, 1923, pp. 132–133, 5 figs. Special applications of this medium in Montreal plant prove its value wherever an adaptable, cheap, and reliable form of power is required.

CONDENSERS, STEAM

Defects. Condenser Troubles. Mar. Engr. & Nav. Architect, vol. 47, no. 556, Jan. 1924, pp. 31–32, 4 figs. Consideration of defects common in condensers, and effect of application of metallic packing.

CORROSION

Electrochemical Character. The Electrochemical Character of Corrosion, Ulick R. Evans. Inst. Metals—advance paper, no. 5, for meeting Sept. 10–13, 1923, 44 pp., 4 figs. Prediction of electrochemical corrosion from potential measurements; experimental demonstration of electrochemical character of corrosion.

COST ACCOUNTING

Capital Requirements and Control. The Story Told by the Financial and Operating Statements, J. H. Bliss. Management & Administration, vol. 7, no. 1, Jan. 1924, pp. 25–30. Author takes typical financial statement and analyzes it so as to show wide range of essential information that can be drawn from its figures.

Industrial. Industrial Cost Accounting for Executives, Paul M. Atkins. Am. Mach., vol. 59, nos. 14 and 16, Oct. 4 and 18, 1923, pp. 513–517 and 591–594, 11 figs. Oct. 4: Recording product and improvement costs; checking distribution and summaries of items of cost. Oct. 18: Mechanical-labor-saving devices; reason for use of adding, calculating and tabulating machines, and schedule sheet.

CRANES

Lifting. Locomotive Lifting Cranes (Lokomotiv-Hebekrane), F. Scheuermann. Glasers Annalen, vol. 93, no. 10, Nov. 15, 1923, pp. 113–115, 9 figs. Design and construction of cranes constructed by Demag Duisburg, Germany.

Runway. A Reinforced-Concrete Crane Runway with Steel Traveling Crane (Eine Eisenbetonkranbahn mit Stahlkonstruktionslaufkran), C. Commentz. Beton u. Eisen, vol. 22, no. 16, Aug. 20, 1923, pp. 205–209, 12 figs. Describes crane runway built for material-storage section of shipyard in Hamburg, for unloading of ship plates and sections from railway cars and ships, and loading on cars of shipyard railway.

CUPOLAS

Charging. The Foundry Cupola and Mechanical Charging, A. A. Leardet. Foundry Trade Jl., vol. 28, no. 384, Dec. 27, 1923, pp. 539–543, 11 figs. Chemical action which takes place in cupola under blast; early forms of cupolas; steam jet cupolas; receivers; coke consumption; blast and tuyeres; blowing apparatus; hot-blast cupolas.

CUTTING TOOLS

Overhang as Affecting Shop Costs. How the Overhang of Tools Affects Shop Costs, Chas. F. Henry. Am. Mach., vol. 60, no. 1, Jan. 3, 1924, pp. 17–19, 9 figs. Examples from modern railway shops that can apply elsewhere as well; preventing vibration lengthens life of tools.

D

DIE CASTING

Electrical Parts. Die-Casting of Electrical Parts, Wm. C. Hirsch. Elec. Rec., vol. 34, no. 6, Dec. 1923, pp. 354–356, 2 figs. Discusses special interest which electrical industry has in die-cast parts; die-casting limitations; improvements.

DIES

Progressive. Progressive Dies for Piercing, Bending and Blanking, I. Bernard Black. Machy. (N. Y.), vol. 30, no. 5, Jan. 1924, pp. 371–372, 5 figs. partly on p. 373. Describes "follow" and "progressive" die employed to produce locating bracket used in electrical device.

DIESEL ENGINES

Fuel Valve. A New Solid Injection Fuel Valve. Practical Engr., vol. 67, no. 1875, Feb. 1, 1923, p. 63, 1 fig. New type of fuel valve invented by A. F. Van Amstel of Holland.

Generator Drive. Oil-Engine-Driven Ship Generators in the Germany Navy (Der ölmotorische Antrieb von Borddynamos in der deutschen Kriegsmarine), W. Laudahn. Schiffbau, vol. 24, nos. 33–34, 35, 36–37, 38, 40–41, 42 and 46, May 16–23, 30, June 6–13, 20, July 4–11, 18 and Aug. 15, 1923, pp. 525–533, 549–554, 567–571, 593–599, 633–639, 659–664 and 719–725, 58 figs. Notes, including official data, on development of high-speed Diesel engines for dynamo drive. May 16–23: Engines with 40- and 60-kw. output; engine of Benz & Co. for mine cruiser, Bremse. May 30 and June 6: Daimler engine for small cruiser, Nürnberg. June 20: Vulcan works engine for small cruiser, Wiesbaden. July 4: Körting engine for small cruiser. Emden. July 18: Engine of Linke-Hofmann Works, Breslau, for small cruiser, Köln. Aug. 15: Sulzer Bros. engine for mine cruiser, Brummer.

Hydroelectric Plants. Put the Diesel Engine in the Hydro-Electric Business, A. Bücchi. Oil Engine Power, vol. 1, no. 12, Dec. 1923, pp. 574–581, 5 figs. Study of use of Diesel engines in hydroelectric undertakings.

McIntosh & Seymour. An American Built Diesel Engine, Peter Bain. Am. Shipg., vol. 17, no. 12, Dec. 1923, pp. 42–47, 8 figs. Details of 2250-hp. engine of vertical, single-acting, 4-cycle, crosshead type, being built at Auburn plant of McIntosh & Seymour Corp.

Repairing. Overhauling a Diesel Engine, M. S. Howard. Power Plant Eng., vol. 28, no. 2, Jan. 15, 1924, pp. 139–141, 7 figs. Where to look for wear and how to handle repair work.

DRILLING MACHINES

Development. Fifty Years Development in Drilling Machines. Machy. (N. Y.), vol. 30, no. 5, Jan. 1924, pp. 352–354, 2 figs. Comparison between early and present-day designs of upright and radial drilling machines.

Fifty Years of Drilling Machine Specialization. Am. Mach., vol. 60, no. 1, Jan. 3, 1924, pp. 21–23. Drilling-machine history of past half century of Cincinnati Bickford Tool Co.; contrast between machines and performances of former years and today. See also Iron Age, vol. 113, no. 1, Jan. 3, 1924, pp. 61–65.

E

EDUCATION, ENGINEERING

Relation to Industry. The Engineer as a Leader in Industry, O. S. Lyford. Eng. Education, vol. 14, no. 4, Dec. 1923, pp. 156–183, 4 figs. Shows interrelationship between engineering schools and industries and need for coöperation of the two organizations interested in development and successful functioning of leadership in industry; survey of situation; suggests groundwork for an educational-industrial structure.

ELASTICITY

Theory. Contributions to the Theory of Elasticity (Beiträge zur ebenen Elastizitätstheorie), Karl Wolf. Zeit. für technische Physik, vol. 4, no. 10, 1923, pp. 375–379, 5 figs. Notes on stress distribution in an arch.

ELECTRIC FURNACES

Ferrovanadium Manufacture. Manufacture of Ferro-Vanadium by Electric Furnace, E. Kilburn Scott. Engineer, vol. 136, no. 3546, Dec. 14, 1923, pp. 636–637, 6 figs. Describes electric furnace installed by Vanadium Corp. of America in Peruvian mine.

Salt-Bath. The Electric Salt-Bath Furnace in Workshop Practice (Der elektrische Salzbadofen im Werkstättenbetriebe), K. Hilse. Werkstattstechnik,

Manufactured by Advertisers — CLASSIFIED LIST OF MECHANICAL EQUIPMENT — Alphabetical List on page 156

* Clarage Fan Co.
* Erie City Iron Works
* Harrisburg Fdry. & Mach. Wks.
* Nordberg Mfg. Co.

Engines, Steam, Poppet Valve
* Erie City Iron Works
* Nordberg Mfg. Co.
* Vilter Mfg. Co.

Engines, Steam, Throttling
* Brownell Co.
* Clarage Fan Co.

Engines, Steam, Una-Flow
* Frick Co. (Inc.)
* Harrisburg Fdry. & Mach. Wks.
* Nordberg Mfg. Co.
Ridgway Dynamo & Engine Co.

Engines, Steam, Variable Speed
* Brownell Co.
* Harrisburg Fdry. & Mach. Wks.
* Nordberg Mfg. Co.

Engines, Steam, Vertical (Fully Enclosed, Self-Oiling)
* Clarage Fan Co.
* Troy Engine & Machine Co

Engines, Steering
Lidgerwood Mfg. Co

Evaporators
* Croll-Reynolds Engrg. Co. (Inc.)
Farrel Foundry & Machine Co.
* Vogt, Henry Machine Co.

Excavating Machinery
Clyde Iron Works Sales Co.
Lidgerwood Mfg. Co.
Link-Belt Co.

Exhaust Heads
Hoppes Mfg. Co.

Exhaust Systems
* Allington & Curtis Mfg. Co.
* American Blower Co.
* Clarage Fan Co.
* Sturtevant, B. F. Co.

Exhausters, Gas
* American Blower Co.
* Clarage Fan Co.
* General Electric Co.
* Green Fuel Economizer Co.
* Schutte & Koerting Co.
* Sturtevant, B. F. Co.

Extractors, Centrifugal
Fletcher Works
Tolhurst Machine Works

Extractors, Oil and Grease
* American Schaeffer & Budenberg Corp'n
* Kieley & Mueller (Inc.)

Factory Equipment, Metal
Manufacturing Equipment & Engrg. Co.

Fans, Exhaust
* American Blower Co.
* Clarage Fan Co.
* Coppus Engineering Corp'n
* General Electric Co.
* Green Fuel Economizer Co.
Philadelphia Drying Mchry. Co.
* Sturtevant, B. F. Co.

Fans, Exhaust, Mine
* Sturtevant, B. F. Co.

Feeders, Pulverized Fuel
* Combustion Engineering Corp'n
* Fuller-Lehigh Co.
Grindle Fuel Equipment Co.
* Smidth, F. L. & Co.

Filters, Air
Reed Air Filter Co. (Inc.)

Filters, Feed Water, Boiler
* Permutit Co.

Filters, Feed Water, Demulsifying
* Permutit Co.

Filters, Gravity
* Permutit Co.

Filters, Mechanical
* Permutit Co.

Filters, Oil
* Bowser, S. F. & Co. (Inc.)
Elliott Co.
* General Electric Co.
Nugent, Wm. W. & Co. (Inc.)
* Permutit Co.

Filters, Pressure
* Graver Corp'n
* Permutit Co.

Filters, Water
Elliott Co.
* Graver Corp'n
* H. S. B. W.-Cochrane Corp'n
* Permutit Co.
* Scaife, Wm. B. & Sons Co.

Filtration Plants
* Graver Corp'n
* H. S. B. W.-Cochrane Corp'n
International Filter Co.
* Permutit Co.
* Scaife, Wm. B. & Sons Co.

Fire Brick, Fire Hydrants, etc.
(See Brick, Hydrants, Fire, etc.)

Fittings, Ammonia
* Crane Co.
* De La Vergne Machine Co.
* Frick Co. (Inc.)
* Vilter Mfg. Co.
* Vogt, Henry Machine Co.

Fittings, Compression
* Bowser, S. F. & Co. (Inc.)
Lunkenheimer Co.

Fittings, Flanged
* Builders Iron Foundry
* Central Foundry Co.
* Crane Co.
* Edward Valve & Mfg. Co.
Kennedy Valve Mfg. Co.
Lunkenheimer Co.
* Pittsburgh Valve, Fdry. & Const. Co.
* Reading Steel Casting Co. (Inc.)
(Reading Valve & Fittings Div.)
* U. S. Cast Iron Pipe & Fdry. Co.
* Vogt, Henry Machine Co.

Fittings, Hydraulic
* Crane Co.
* Pittsburgh Valve, Fdry. & Const. Co.
* Reading Steel Casting Co. (Inc.)
(Reading Valve & Fittings Div.)
* Vogt, Henry Machine Co.

Fittings, Pipe
* Barco Mfg. Co.
* Central Foundry Co.
* Crane Co.
Kennedy Valve Mfg. Co.
Lunkenheimer Co.
* Pittsburgh Valve, Fdry. & Const. Co.
* Reading Steel Casting Co. (Inc.)
(Reading Valve & Fittings Div.)
Steere Engineering Co.
* Vogt, Henry Machine Co

Fittings, Steel
* Crane Co.
* Edward Valve & Mfg. Co.
Lunkenheimer Co.
* Pittsburgh Valve, Fdry. & Const. Co.
* Reading Steel Casting Co. (Inc.)
(Reading Valve & Fittings Div.)
Steere Engineering Co.
* Vogt, Henry Machine Co.

Flanges
* American Spiral Pipe Works
* Crane Co.
* Edward Valve & Mfg. Co.
Kennedy Valve Mfg. Co.
Lunkenheimer Co.
* Pittsburgh Valve, Fdry. & Const. Co.
* Reading Steel Casting Co. (Inc.)
(Reading Valve & Fittings Div.)
* Vogt, Henry Machine Co.

Flanges, Forged Steel
Cann & Saul Steel Co.

Floor Armor
* Irving Iron Works Co.

Floor Stands
* Chapman Valve Mfg. Co.
* Crane Co.
* Jones, W. A. Fdry. & Mach. Co.
Kennedy Valve Mfg. Co.
Lunkenheimer Co.
* Pittsburgh Valve, Fdry. & Const. Co.
* Reading Steel Casting Co. (Inc.)
(Pratt & Cady Division)
* Royersford Fdry. & Mach. Co.
* Schutte & Koerting Co.
* Wood's, T. B. Sons Co.

Flooring-Grating
* Irving Iron Works Co.

Flooring, Metallic
* Irving Iron Works Co.

Flooring, Rubber
* United States Rubber Co.

Flour Milling Machinery
* Allis-Chalmers Mfg. Co.

Flue Gas Analysis Apparatus
* Tagliabue, C. J. Mfg. Co.

Fly Wheels
* Medart Co.
* Nordberg Mfg. Co.
* Wood's, T. B. Sons Co.

Fonts, Outdoor Bubble
Murdock Mfg. & Supply Co.

Forgings, Drop
* Vogt, Henry Machine Co.

Forgings, Hammered
Cann & Saul Steel Co.

Forgings, Iron and Steel
Cann & Saul Steel Co

Foundry Equipment
Northern Engineering Works
* Whiting Corp'n

Friction Clutches, Hoists, etc.
(See Clutches, Hoists, etc., Friction)

Friction Drives
Rockwood Mfg. Co.

Frictions, Paper and Iron
Link-Belt Co.
Rockwood Mfg. Co.

Fuel Economizers
(See Economizers, Fuel)

Furnace Construction
Furnace Engineering Co.

Furnaces, Annealing and Tempering
* General Electric Co.
* Kenworthy, Chas. F. (Inc.)
* Whiting Corp'n

Furnaces, Boiler
* American Engineering Co.
* American Spiral Pipe Wks.
* Babcock & Wilcox Co.
* Bernitz Furnace Appliance Co.
* Combustion Engineering Corp'n
* Detroit Stoker Co.
* Riley, Sanford Stoker Co.

Furnaces, Case Hardening
* Kenworthy, Chas. F. (Inc.)

Furnaces, Down Draft
* O'Brien, John Boiler Works Co.

Furnaces, Electric
Detroit Electric Furnace Co.
* Kenworthy, Chas. F. (Inc.)
* Westinghouse Elect. & Mfg. Co.

Furnaces, Forging
* Kenworthy, Chas. F. (Inc.)

Furnaces, Hardening
* Kenworthy, Chas. F. (Inc.)

Furnaces, Heat Treating
* General Electric Co.
* Kenworthy, Chas. F. (Inc.)

Furnaces, Melting
Detroit Electric Furnace Co.
* General Electric Co.
* Whiting Corp'n

Furnace, Non-Ferrous
Detroit Electric Furnace Co.

Furnaces, Non-Oxidizing
* Kenworthy, Chas. F. (Inc.)

Furnaces, Powdered Coal
Grindle Fuel Equipment Co.

Furnaces, Smokeless
* American Engineering Co.
* Babcock & Wilcox Co.
* Combustion Engineering Corp'n
* Detroit Stoker Co.
Herbert Boiler Co.
* Riley, Sanford Stoker Co.

Fuses
* General Electric Co.
Johns-Manville (Inc.)
* Westinghouse Elect. & Mfg. Co.

Gage Boards
* American Schaeffer & Budenberg Corp'n
* Ashton Valve Co.
* Crosby Steam Gage & Valve Co.

Gage Glasses
* American Schaeffer & Budenberg Corp'n

Gage Glasses, Inclined
Sesure Water Gauge Co.

Gage Testers
* American Schaeffer & Budenberg Corp'n
* Ashton Valve Co.
* Crosby Steam Gage & Valve Co.

Gages, Altitudes
* American Schaeffer & Budenberg Corp'n
* Ashton Valve Co.
* Crosby Steam Gage & Valve Co.

Gages, Ammonia
* American Schaeffer & Budenberg Corp'n
* Ashton Valve Co.
* Crosby Steam Gage & Valve Co.
* Vogt, Henry Machine Co.

Gages, Differential Pressure
* American Schaeffer & Budenberg Corp'n
Bacharach Industrial Instrument Co.
* Bailey Meter Co.
* Tagliabue, C. J. Mfg. Co.
* Uehling Instrument Co.

Gages, Draft
* American Schaeffer & Budenberg Corp'n
* Ashton Valve Co.
Bacharach Industrial Instrument Co.
* Bailey Meter Co.
* Bristol Co.
* Tagliabue, C. J. Mfg. Co.
* Taylor Instrument Cos.
* Uehling Instrument Co.

Gages, Hydraulic
* American Schaeffer & Budenberg Corp'n
* Ashton Valve Co.
* Crosby Steam Gage & Valve Co.

Gages, Liquid Level
* Bristol Co.
Lunkenheimer Co.
* Simplex Valve & Meter Co.

Gages, Loss of Head
* Builders Iron Foundry
* Simplex Valve & Meter Co.

Gages, Measuring (Surface, Depth, Dial, etc.)
* Norma Co. of America

Gages, Pressure
* American Schaeffer & Budenberg Corp'n
* Ashton Valve Co.
Bacharach Industrial Instrument Co.
* Bailey Meter Co.
* Bristol Co.
* Crosby Steam Gage & Valve Co.
* Tagliabue, C. J. Mfg. Co.
* Uehling Instrument Co.

Gages, Rate of Flow
Bacharach Industrial Instrument Co.
* Bailey Meter Co.
* Builders Iron Foundry
* Simplex Valve & Meter Co.

Gages, Syphon
* Tagliabue, C. J. Mfg. Co.

Gages, Vacuum
* American Schaeffer & Budenberg Corp'n
* Ashton Valve Co.
Bacharach Industrial Instrument Co.
* Bristol Co.
* Crosby Steam Gage & Valve Co.
* Tagliabue, C. J. Mfg. Co.
* Taylor Instrument Cos.
* Uehling Instrument Co.

Gages, Water
* American Schaeffer & Budenberg Corp'n
* Ashton Valve Co.
* Bristol Co.
* Crane Co.
* Jenkins Bros.
Lunkenheimer Co.
* Reading Steel Casting Co. (Inc.)
(Pratt & Cady Division)
* Simplex Valve & Meter Co.

Gages, Water Level
* American Schaeffer & Budenberg Corp'n
* Bristol Co.
Lunkenheimer Co.
* Simplex Valve & Meter Co.

Galvanizing
* Geuder, Paeschke & Frey Co.

Gas Plant Machinery
* Cole, R. D. Mfg. Co.
Steere Engineering Co.

Gaskets
Garlock Packing Co.
* Jenkins Bros.
Johns-Manville (Inc.)
* Sarco Co. (Inc.)

Gaskets, Iron, Corrugated
Smooth-On Mfg. Co.

Gaskets, Rubber
Garlock Packing Co.
* Goodrich, B. F. Rubber Co.
* United States Rubber Co.

Gates, Blast
Steere Engineering Co.

Gates, Cut-off
Easton Car & Construction Co.
Link-Belt Co.

Gates, Sluice
* Chapman Valve Mfg. Co.
* Pittsburgh Valve, Fdry. & Const. Co.

Gear Blanks
Cann & Saul Steel Co.

Gear Cutting Machines
* Jones, W. A. Fdry. & Mach. Co.

Gear Hobbing Machines
* Jones, W. A. Fdry. & Mach. Co.

Gears, Bakelite
Ganschow, Wm. Co.

Gears, Cut
* Brown, A. & F. Co.
Chain Belt Co.

vol. 17, no. 22, Nov. 15, 1923, pp. 625–632, 10 figs. Principle of furnace; use of melted salt for electric heat resistance and at same time for heat conduction and storage; advantages of electric salt-bath furnace; design and operation; advantages of two new processes; regulation and measurement of bath temperature.

ELECTRIC LOCOMOTIVES

Mexican Railway. Ten Locomotives Being Built for Mexican Railway, G. H. Walker. Ry. Elec. Engr., vol. 14, no. 12, Dec. 1923, pp. 403–406, 3 figs. Details of 150-ton 3000-volt d. c. electric locomotives for initial electrification of Mexican Ry. Co.; one type motive-power unit will be used for both passenger and freight service.

Speed Tests. Speed Tests of New Electric Locomotives. Ry. Rev., vol. 73, no. 23, Dec. 8, 1923, pp. 818–820, 2 figs. Experimental runs on track equipped with recording instruments determines riding qualities at high speed.

ELECTRIC RAILWAYS

Current-Flow Values, Determination. A New Method of Determining Correct Values of Current Flow for Electric Railway Distribution Systems, C. E. Schutt. Elec. Traction, vol. 19, nos. 8, 10 and 11, Aug., Oct. and Nov. 1923, pp. 422–425, 568–570 and 607–611, 12 figs. Describes new method which enables operator to be sure of results without building of models; describes fundamental solution of a simple loop; the method as applied to specific problems of Kansas City Rys.; application to street-railway return circuit.

Italy. Electric Railways in Italy. Elec. Rev., vol. 93, no. 2405, Dec. 28, 1923, pp. 964–967, 2 figs. Power production; 3-phase traction; transformer stations and contact lines; electric locomotives; Turin-Modane line; electricity vs. steam.

Rome-Ostia Electric Railway. Elec. Ry. & Tramway Jl., vol. 49, no. 1215, Dec. 14, 1923, pp. 323–324, 4 figs. D. c. at 2400 volts; length 24.8 km.; notes on substation, contact, line, rolling stock, locomotives, and motor cars.

Technical Problems. Electric Traction, Geo. Gibbs. Am. Ry. Eng. Assn.—Bul., vol. 25, no. 259, Sept. 1923, 86 pp., 35 figs. Electric traction on lines with much traffic; production and transmission of energy; type of current; locomotives and motor cars; electric systems used; installation and operating costs; some factors controlling selection of system; synopsis of important installations. Report made to Int. Ry. Assn., Ninth Congress, Rome, Italy, 1922.

ELECTRIC WELDING

Railway Shops. Electric Welding in Railway Shops, Juan St. Cere. Ry. Jl., vol. 29, no. 12, Dec. 1923, pp. 30–31. Shows what has been accomplished with electric-welding process in plant of N. Y. C.'s Depew shops.

ELECTRIC WELDING, ARC

Fluxes. Fluxes and Their Functions in Electric Arc Welding, J. Caldwell. Am. Welding Soc.—Jl., vol. 2, no. 12, Dec. 1923, pp. 27–31 and (discussion by C. J. Holslag) 31–32. Character of a weld; fluxes in steel manufacture; fluxes and their functions in arc welding; flux-covered electrodes for arc welding.

Rail Bonds. Arc Welded Rail Bonds, C. F. Gailor. Am. Welding Soc.—Jl., vol. 2, no. 12, Dec. 1923, pp. 7–17, 10 figs. History; character of bonds; use of molds; carbon arc welding; metallic arc welding; process in applying bonds to head of rail; procedure in applying base bonds; tests.

ELEVATORS

Variable-Voltage Control. Variable Voltage Control Systems as Applied to Electric Elevators, E. M. Bouton. Am. Inst. Elec. Engrs.—Jl., vol. 43, no. 1, Jan. 1924, pp. 52–63, 16 figs. Conclusions in favor of variable-voltage over rheostatic-control system, with regard to speed, acceleration and retardation, speed control and regulation, efficiency and economy of power consumption, maintenance, and safety.

EMPLOYMENT MANAGEMENT

Employees' Magazine. The Employees Magazine—Its Duties and Opportunities. Nat. Safety News, vol. 8, no. 6, Dec. 1923, pp. 39–45, 3 figs. A symposium of ideas on editorial methods and policies in connection with publication of employees' magazine intended to be a vital force for safety in plant.

Rating Shop Employees. A Practical System for Rating Shop Employees, A. H. Rodrick. Factory, vol. 32, no. 1, Jan. 1924, p. 32, 1 fig. Describes system of marking efficiency of shop employees used in shops of Naval Torpedo Station.

EVAPORATION

Compression vs. Multiple-Effect. Compression Evaporation (Ueber Kompressionsverdampfung), W. Genseke. Wärme, vol. 46, no. 12, Mar. 23, 1923, pp. 123–126, 5 figs. It is shown that compression evaporation is by no means superior to multiple-effect arrangement; introduction of heat pump is of value when a given temperature must be maintained in evaporation process; turbo and radiation compressors are particularly adapted to drive.

Multiple-Effect. Fundamental Principles of Multiple Effect Evaporation, Hugh K. Moore. Chem. & Met. Eng., vol. 29, nos. 26 and 27, Dec. 24 and 31, 1923, pp. 1144–1147, 2 figs., and 1190–1192, 8 figs. Dec. 24: Effects on evaporator designs and operation of heat conductivity, temperature levels and temperature differences. Dec. 31: Analysis of relation of heat conductivity to temperature differences in evaporating waste sulphite liquor.

EVAPORATORS

Refrigerating Plants. Evaporating Systems for Refrigerating Plant, Wm. F. Davis. Power, vol. 58, no. 26, Dec. 25, 1923, pp. 1028–1029. Discusses details of evaporator design; evaporators in several units; purifying refrigerant; testing for water in system. Paper read before Nat. Assn. Practical Refrig. Engrs.

EYEBOLTS

Standards for. Report of the German Industrial Standards Committee (Normenausschuss der Deutschen Industrie). Maschinenbau, vol. 3, no. 1, Oct. 11, 1923, pp. N1–N4, 4 figs. Proposed standards for eyebolts and nuts.

F

FANS

Electric Drive for. Electric Drive for Centrifugal and Propeller Fans, Gordon Fox. Coal Industry, vol. 6, no. 12, Dec. 1923, pp. 503–507, 3 figs. Characteristics of fans operated at various percentages of rating with curves showing pressures, velocity heads, horsepower required and efficiencies.

FERROALLOYS

Developments 1923. Ferroalloy Developments in the Past Year, Rob. J. Anderson. Iron Age, vol. 113, no. 1, Jan. 3, 1924, pp. 94–97. Market conditions and results of metallurgical research; growing field of special alloys.

FIREBRICK

Malleable-Iron Furnace Bungs. The Behavior of Fire Brick in Malleable-Iron Furnace Bungs, H. G. Schurecht and H. W. Douda. Am. Ceramic Soc.—Jl., vol. 6, no. 12, Dec. 1923, pp. 1232–1241, 7 figs. Investigation conducted to study requirements of fireclay and bodies used for firebrick in malleable-iron furnace bungs; describes tests made on complete bungs holding 40 sample brick in malleable-iron furnace bungs with 20 different firebrick, and results obtained.

FLIGHT

Gliding. Gliding Flight. Zeit. für Flugtechnik u. Motorluftschiffahrt, vol. 14, no. 17–22, Nov. 21, 1923, pp. 147–160. Includes following articles: Gliding Flight in Germany in the Past Year and Its Future Aims (Der deutsche Segelflug im vergangenen Sportjahre und seine künftigen Ziele), A. Baeumker, pp. 147–150; Has Gliding Flight a Future? (Hat der Segelflug eine Zukunft?), A. Pröll, pp. 150–151; The Promotion of Gliding Flight (Betrachtungen zur Förderung des Segelflugs), Wilh. Hoff, pp. 151–152; The Mechanics of Gliding Flight (Zur Mechanik des Segelfluges), E. Everling, pp. 152–154; The Rhön Competition 1923 (Bemerkungen über Rhön-Wettbewerb 1923), W. Schlink, pp. 154–157, 1 fig.; The Rope Starting of Motorless Airplanes and Anchored Flight (Seilstart motorloser Flugzeuge und Fesselflug), E. Offermann, pp. 157–159, 6 figs., etc.

The Rhön Gliding Flight Competition 1923 in Its Technical Evaluation (Der Rhön-Segelflugwettbewerb 1923 in seiner technischen Auswertung), R. Eisenlohr. Zeit. für Flugtechnik u. Motorluftschiffahrt, vol. 14, no. 17–22, Nov. 21, 1923, pp. 136–145 and (discussion) 145–147, 25 figs. Description of participating planes and account of performances.

The Valuation of Gliding Flight (Wertung von Segelflügen), E. Everling. Zeit. für Flugtechnik u. Motorluftschiffahrt, vol. 14, no. 17–22, Nov. 21, 1923, pp. 135–136. Discusses aims and purposes of gliding flight.

Horizontal Curvilinear. Airplanes in Horizontal Curvilinear Flight, H. Kann. Nat. Advisory Committee for Aeronautics—Tech. Notes, no. 174, Jan. 1924, 25 pp., 12 figs. Gives simple method of calculation, and indicates method for determining area of aileron and rudder surfaces. Translated from Technische Berichte, vol. 3, no. 7.

Inverted. The Manœuvres of Inverted Flight, R. M. Hill. Roy. Aeronautical Soc.—Jl., vol. 27, no. 156, Dec. 1923, pp. 569–602 and (discussion) 602–605, 11 figs. Definition of inverted flight; reasons for investigation; nature of experiment; methods of attaining inverted position; effect of controls in inverted flight; resuming normal flight; the slow roll; the inverted spin; possibilities of inverted loop; conclusions.

Soaring. The "Mystery" of Soaring Flight, W. H. Sayers. Aeroplane, vol. 25, nos. 20 and 21, Nov. 14 and 21, 1923, pp. 488 and 508. Discusses results of observations made by E. H. Hainkn, and especially his paper read before Instn. Aeronautical Engrs., Nov. 9, dealing with noise and color changes, descending current theory, dust, contour and convection currents, gulls and steamers, turbulence, etc.

Wind Energy and the Aeroplane. Aeroplane, vol. 25, no. 25, Dec. 19, 1923, p. 586. Energy of gusts; meaning of indicated air speed; effect of rapid wind variations; alternating vertical winds; possibilities of using wind energy for flight.

FLOW OF FLUIDS

Rough Pipes. Flow Resistance in Rough Pipes (Strömungswiderstand in rauhen Rohren), K. Fromm. Zeit. für angewandte Mathematik u. Mechanik, vol. 3, no. 5, Oct. 1923, pp. 339–358, 30 figs. Results of tests to investigate influence of roughness of pipe wall on pressure head in connection with flow of liquids through rough pipes.

The Measurement of Hydraulic Roughness (Die Messung der hydraulischen Rauhigkeit), L. Hopf. Zeit. für angewandte Mathematik u. Mechanik, vol. 3, no. 5, Oct. 1923, pp. 329–339, 6 figs. Account and results of tests; discusses two kinds of roughness; notes on empirical formulas of hydraulics.

FLOW OF STEAM

Measurement. The Measurement of Steam Through Orifices (Die Messung des Wasserdampfes durch Blenden), R. Geipert. Zeit. für angewandte Chemie, vol. 36, no. 66, Oct. 3, 1923, pp. 492–494, 5 figs. Describes method for measuring volume of flowing steam which is said to be accurate, simple and almost free of cost.

FLOW OF WATER

Discharge Coefficients. Determining Discharge Coefficients for Flow of Water in Short Pipes, O. W. Boston. Chem. & Met. Eng., vol. 30, no. 2, Jan. 14, 1924, pp. 56–59, 5 figs. Short method for determining loss of head for water flowing in pipes which may be readily applied in other cases of fluid flow.

Pipes. Velocity of Flow in Pipes, Eric Crewdson. Engineer, vol. 136, no. 3546, Dec. 14, 1923, pp. 635–636, 1 fig. Results of salt-method readings.

FLUE-GAS ANALYSIS

Testing Apparatus. Testing Flue Gases (En ny rökgasprovare), Folke K. G. Odqvist. Teknisk Tidskrift (Allmänna Avdelningen), vol. 53, no. 46, Nov. 17, 1923, pp. 357–358, 2 figs. Describes new flue-gas tester made by German concern, fundamental principle of which is based on difference in transmission of heat by different gases.

FORGINGS

Design. The Economical Construction of Forgings (Wie muss der Konstrukteur konstruieren, um eine wirtschaftliche Herstellung von Schmiedestücken zu erzielen?), M. Rinno. Maschinenbau, vol. 2, no. 24, Sept. 15, 1923, pp. G260–G262, 29 figs. Shows correct and incorrect designs and gives directions which should be followed in design of forge pieces for different forging processes.

FOUNDRIES

Cast-Iron Borings and Turnings Utilization. The Briquetting and Use of Cast-Iron Borings and Turnings, J. Alex. Gardner. Foundry Trade Jl., vol. 28, no. 382, Dec. 13, 1923, pp. 501–505, 10 figs. Early attempts; results of melting experiments; production data; drying process; results of mechanical tests; blast control.

Molding-Machine Practice. A Discussion on Pressure-Moulding Machine Practice. Foundry Trade Jl., vol. 28, no. 382, Dec. 13, 1923, pp. 511–513. Discussion following paper read by A. S. Beech on "Continental Foundry Practice." Deals with venting casserole molds, pattern plate making, venting and pressing, British and Continental sand, factors in speed of working, railway chair making, etc.

Safety Code. Safety Code for the Protection of Industrial Workers in Foundries. U. S. Bur. Labor Statistics, Bul. No. 336, Apr. 1923, 12 pp. Tentative American standard approved June 1922 by Am. Eng. Standards Committee, dealing with plant layout, machines and equipment, lighting, heating and ventilation, operating rules, and safety and welfare.

Transport in. Foundry Transport (Das Giesserei-Transportwesen), K. Zapf. Maschinenbau, vol. 3, no. 1, Oct. 11, 1923, pp. B1–B7, 8 figs. Delivery of raw materials and fuels to storage places; charging of cupolas; transport of liquid iron to foundry, and of molding material to sand-dressing machines; transport of patterns from storage room to foundry; transport of slag; etc.

FOUNDRY EQUIPMENT

Pneumatic Tools. Growing Importance of Compressed Air in the Foundry, R. G. Skerrett. Compressed Air Mag., vol. 28, no. 12, Dec. 1923, pp. 703–710, 30 figs. How compressed air and pneumatic tools make it possible for skilled man to do more work without overtaxing himself and unskilled man much good work which he could not do without these up-to-date aids.

FREIGHT HANDLING

Container System. Demountable Containers Expedite Freight Handling in Michigan, E. J. Burdick. Elec. Ry. Jl., vol. 62, no. 26, Dec. 29, 1923, pp. 1077–1079, 6 figs. Describes method adopted by Detroit United Ry. for handling freight in less-than-carload lots to facilitate loading and allow through routing of shipment without rehandling; consists of use of containers that can be loaded and sealed at point of origin and carried on special chassis to point where containers are loaded on special flat car of railway; mechanics of containers.

FUELS

Coal. See COAL; PULVERIZED COAL.

Cost Determination. Plotting Relative Cost of Various Fuels, R. I. Wynne-Roberts. Can. Engr., vol. 45, no. 25, Dec. 18, 1923, pp. 589–592, 3 figs. Graphic charts showing relation between different fuels as to relative cost for same service; method of deriving and preparing graphs, and how to apply them in practice.

Oil. See OIL FUEL.

Pulverized Coal. See PULVERIZED COAL.

Refuse. Modern Viewpoints for the Construction of Refuse Power Plants, H. Marcard. Eng. Progress, vol. 4, no. 11, Nov. 1923, pp. 237–240, 5 figs. Discusses development in Germany, and processes and plants for burning refuse of low heating value.

Relative Economy. The Fuel of the Future—What Shall It Be? I. Ginsberg. Am. Gas Jl., vol. 118, no. 26, and vol. 119, nos. 10, 13, 20, 24 and 27, June 30, Sept. 8, 29, Oct. 20, Nov. 17 and Dec. 8, 1923, pp. 557–561; 193–196 and 204–205; 253–257 and 264; 457–461; 545–547 and 556–558; and 609–611 and 621–623, 3 figs. Classification of fuels and discussion of properties of each and supplies in United States, to determine best fuel for universal usage; properties of a universal fuel; analysis of losses that occur in combustion of fuel; comparison of combustion efficiency of gas, coke and coal; definition of units; shows that gas is most economical fuel from standpoint of utilization of its inherent fuel value.

Manufactured by Advertisers — CLASSIFIED LIST OF MECHANICAL EQUIPMENT — Alphabetical List on page 156

* De Laval Steam Turbine Co.
Farrel Foundry & Machine Co.
* Fawcus Machine Co.
* Foote Bros. Gear & Machine Co.
* James, D. O. Mfg. Co.
Johnson, Carlyle Machine Co.
* Jones, W. A. Fdry. & Mach. Co.
Link-Belt Co.
Mackintosh-Hemphill Co.
* Medart Co.
Northern Engineering Works
Philadelphia Gear Works

Gears, Fibre
* General Electric Co.
* James, D. O. Mfg. Co.

Gears, Grinding
Farrel Foundry & Machine Co.

Gears, Helical
Farrel Foundry & Machine Co.

Gears, Herringbone
* Falk Corporation
Farrel Foundry & Machine Co.
* Fawcus Machine Co.

Gears, Machine Molded
* Brown, A. & F. Co.
Farrel Foundry & Machine Co.
* Jones, W. A. Fdry. & Mach. Co.
Link-Belt Co.

Gears, Micarta
* Westinghouse Elec. & Mfg. Co.

Gears, Rawhide
Farrel Foundry & Machine Co.
Ganschow, Wm. Co.
* James, D. O. Mfg. Co.
Philadelphia Gear Works

Gears, Speed Reduction
Chain Belt Co.
* De Laval Steam Turbine Co.
* Falk Corporation
Farrel Foundry & Machine Co.
* Fawcus Machine Co.
* Foote Bros. Gear & Machine Co.
Ganschow, Wm. Co.
* General Electric Co.
* James, D. O. Mfg. Co.
* Jones, W. A. Fdry. & Mach. Co.
* Kerr Turbine Co.
Link-Belt Co.
Moore Steam Turbine Corp'n
* Sturtevant, B. F. Co.
* Westinghouse Electric & Mfg. Co.

Gears, Worm
Chain Belt Co.
* Cleveland Worm & Gear Co.
* Fawcus Machine Co.
* Foote Bros. Gear & Machine Co.
Ganschow, Mm. Co.
* Gifford-Wood Co.
* James, D. O. Mfg. Co.
* Jones, W. A. Fdry. & Mach. Co.
Link-Belt Co.

Generating Sets
* Allis-Chalmers Mfg. Co.
* American Blower Co.
* Clarage Fan Co.
* Coppus Engineering Corp'n
* De Laval Steam Turbine Co.
* General Electric Co.
* Kerr Turbine Co.
* Sturtevant, B. F. Co.
* Westinghouse Electric & Mfg. Co.

Generators, Electric
* Allis-Chalmers Mfg. Co.
* De Laval Steam Turbine Co.
* General Electric Co.
* Nordberg Mfg. Co.
Ridgway Dynamo & Engine Co.
* Westinghouse Electric & Mfg. Co.

Governors, Air Compressor
* Foster Engineering Co.
* Mason Regulator Co.

Governors, Engine, Oil
* Nordberg Mfg. Co.

Governors, Engine, Steam
* Nordberg Mfg. Co.

Governors, Oil Burner
* Foster Engineering Co.
* Mason Regulator Co.

Governors, Pressure
* Tagliabue, C. J. Mfg. Co.

Governors, Pump
* Bowser, S. F. & Co. (Inc.)
* Davis, G. M. Regulator Co.
* Edward Valve & Mfg. Co.
* Foster Engineering Co.
* Kieley & Mueller (Inc.)
* Mason Regulator Co.
Squires, C. E. Co.
* Tagliabue, C. J. Mfg. Co.

Governors, Steam Turbine
* Foster Engineering Co.

Governors, Water Wheel
* Worthington Pump & Machinery Corp'n

Granulators
* Smidth, F. L. & Co.

Graphite, Flake (Lubricating)
* Dixon, Joseph Crucible Co.

Grate Bars
* Casey-Hedges Co.
* Combustion Engineering Corp'n
* Erie City Iron Works
* Titusville Iron Works Co.
* Vogt, Henry Machine Co.

Grate Bars (for Overfeed and Underfeed Stokers)
Furnace Engineering Co.

Grates, Dumping
* Brownell Co.
* Combustion Engineering Corp'n
* Titusville Iron Works Co.
* Vogt, Henry Machine Co.

Grates, Rocking
* Brownell Co.

Grates, Shaking
* Brownell Co.
* Casey-Hedges Co.
* Combustion Engineering Corp'n
* Erie City Iron Works
* Springfield Boiler Co.
* Titusville Iron Works Co.
* Vogt, Henry Machine Co.

Grating, Flooring
* Irving Iron Works Co.

Grease Cups
(See Oil and Grease Cups)

Grease Extractors
(See Separators, Oil)

Greases
* Dixon, Joseph Crucible Co.
* Royersford Fdry. & Mach. Co.
Vacuum Oil Co.

Grinding Machinery
* Brown, A. & F. Co.
* Smidth, F. L. & Co.

Grinding Machines, Chaser
* Landis Machine Co. (Inc.)

Grinding Machines, Floor
* Builders Iron Foundry
* Royersford Fdry. & Mach. Co.

Grinding Machinery, Knife
* American Machine & Foundry Co.

Gun Metal Finish
* American Metal Treatment Co.

Hammers, Drop
* Franklin Machine Co.
* Long & Allstatter Co.

Hammers, Pneumatic
* Ingersoll-Rand Co.

Hangers, Shaft
* Brown, A. & F. Co.
* Chain Belt Co.
* Falls Clutch & Machinery Co.
* Jones, W. A. Fdry. & Mach. Co.
Link-Belt Co.
* Medart Co.
* Royersford Fdry. & Mach. Co.
* Wood's, T. B. Sons Co.

Hangers, Shaft (Ball Bearing)
* Hyatt Roller Bearing Co.
* S K F Industries (Inc.)

Hangers, Shaft (Roller Bearing)
* Hyatt Roller Bearing Co.
* Jones, W. A. Fdry. & Mach. Co.

Hard Rubber Products
* United States Rubber Co.

Hardening
* American Metal Treatment Co.

Heat Exchangers
* Croll-Reynolds Engineering Co.

Heat Treating
* American Metal Treatment Co.

Heaters, Feed Water (Closed)
* Brownell Co.
* Croll-Reynolds Engineering Co.
* Erie City Iron Works
* Schutte & Koerting Co.
* Walsh & Weidner Boiler Co.
* Wheeler, C. H. Mfg. Co.
* Wheeler Cond. & Engrg. Co.
* Worthington Pump & Machinery Corp'n

Heaters, Feed Water, Locomotive (Open)
* Worthington Pump & Machinery Corp'n

Heaters, Water Supply
Herbert Boiler Co.

Heaters and Purifiers, Feed Water (Open)
* Brownell Co.
Elliott Co.
* Erie City Iron Works
* H. S. B. W.-Cochrane Corp'n
Hoppes Mfg. Co.
* Springfield Boiler Co.
* Wickes Boiler Co.
* Worthington Pump & Machinery Corp'n

Heaters and Purifiers, Feed Water, Metering
* H. S. B. W.-Cochrane Corp'n

Heating and Ventilating Apparatus
* American Blower Co.
* American Radiator Co.
* Clarage Fan Co.
* Sturtevant, B. F. Co.

Heating Specialties
* Foster Engineering Co.
* Fulton Co.

Heating Specialties, Vacuum
* Foster Engineering Co.

Hoisting and Conveying Machinery
* Brown Hoisting Machinery Co.
Chain Belt Co.
Clyde Iron Works Sales Co.
* Gifford-Wood Co.
* Jones, W. A. Fdry. & Mach. Co.
Lidgerwood Mfg. Co.
Link-Belt Co.
Northern Engineering Works

Hoists, Air
* Ingersoll-Rand Co.
* Nordberg Mfg. Co.
Northern Engineering Works
* Whiting Corp'n

Hoists, Belt
Clyde Iron Works Sales Co.
Lidgerwood Mfg. Co.

Hoists, Chain
Northern Engineering Works
Reading Chain & Block Corp'n
* Yale & Towne Mfg. Co.

Hoists, Electric
* Allis-Chalmers Mfg. Co.
* American Engineering Co.
* Brown Hoisting Machinery Co.
Clyde Iron Works Sales Co.
* General Electric Co.
Lidgerwood Mfg. Co.
Link-Belt Co.
* Nordberg Mfg. Co.
Northern Engineering Works
Reading Chain & Block Corp'n
* Yale & Towne Mfg. Co.

Hoists, Gas and Gasoline
Lidgerwood Mfg. Co.

Hoists, Head Gate
Smith, S. Morgan Co.

Hoists, Locomotive & Coach
* Whiting Corp'n

Hoists, Mine
Lidgerwood Mfg. Co.
* Nordberg Mfg. Co.

Hoists, Skip
* Brown Hoisting Machinery Co.
Lidgerwood Mfg. Co.
Link-Belt Co.

Hoists, Steam
(See Engines, Hoisting)

Hose, Acid
* United States Rubber Co.

Hose, Air and Gas
* Goodrich, B. F. Rubber Co.
* United States Rubber Co.

Hose, Fire
* United States Rubber Co.

Hose, Gas
* United States Rubber Co.

Hose, Gasoline
* Goodrich, B. F. Rubber Co.
* United States Rubber Co.

Hose, Metal, Flexible
Johns-Manville (Inc.)

Hose, Oil
* United States Rubber Co.

Hose, Rubber
* Goodrich, B. F. Rubber Co.
* United States Rubber Co.

Hose, Steam
* United States Rubber Co.

Hose, Suction
* United States Rubber Co.

Humidifiers
* American Blower Co.
* Carrier Engineering Corp'n
* Sturtevant, B. F. Co.

Humidity Control
* American Blower Co.
* Carrier Engineering Corp'n
* Sturtevant, B. F. Co.
* Tagliabue, C. J. Mfg. Co.

Hydrants, Fire
Kennedy Valve Mfg. Co.
Murdock Mfg. & Supply Co.
* Reading Steel Casting Co. (Inc.) (Pratt & Cady Division)
* Worthington Pump & Machinery Corp'n

Hydrants, Yard
Murdock Mfg. & Supply Co.

Hydraulic Machinery
* Allis-Chalmers Mfg. Co.
* Ingersoll-Rand Co.
Mackintosh-Hemphill Co.
* Worthington Pump & Machinery Corp'n

Hydraulic Press Control Systems (Oil Pressure)
* American Fluid Motors Co.

Hydrokineters
* Schutte & Koerting Co.

Hydrometers
* Tagliabue, C. J. Mfg. Co.
* Taylor Instrument Cos.

Hygrometers
* Tagliabue, C. J. Mfg. Co.
* Taylor Instrument Cos.
Weber, F. Co. (Inc.)

Ice Making Machinery
* De La Vergne Machine Co.
* Frick Co. (Inc.)
* Ingersoll-Rand Co.
Johns-Manville (Inc.)
* Nordberg Mfg. Co.
* Vilter Mfg. Co.
* Vogt, Henry Machine Co.

Ice Tools
* Gifford-Wood Co.

Idlers, Belt
* Smidth, F. L. & Co.

Indicator Posts
* Crane Co.
Kennedy Valve Mfg. Co.
* Reading Steel Casting Co. (Inc.) (Pratt & Cady Division)

Indicators, CO
* Uehling Instrument Co.

Indicators, CO_2
Bacharach Industrial Instrument Co.
* Uehling Instrument Co.

Indicators, Engine
* American Schaeffer & Budenberg Corp'n
Bacharach Industrial Instrument Co.
* Crosby Steam Gage & Valve Co.

Indicators, Sight Flow
* Bowser, S. F. & Co. (Inc.)

Indicators, SO_2
* Uehling Instrument Co.

Indicators, Speed
* American Schaeffer & Budenberg Corp'n
Veeder Mfg. Co.

Injectors
* Schutte & Koerting Co.

Injectors, Air
* Croll-Reynolds Engrg. Co.

Instruments, Electrical Measuring
* General Electric Co.
* Taylor Instrument Cos.
* Westinghouse Electric & Mfg. Co.

Instruments, Oil Testing
* Tagliabue, C. J. Mfg. Co.

Instrument, Recording
* American Schaeffer & Budenberg Corp'n
* Ashton Valve Co.
Bacharach Industrial Instrument Co.
* Baily Meter Co.
* Bristol Co.
* Builders Iron Foundry
* Crosby Steam Gage & Valve Co.
* General Electric Co.
* Tagliabue, C. J. Mfg. Co.

*Catalogue data of firms marked * appear in the A.S.M.E. Condensed Catalogues of Mechanical Equipment, 1923-24 Volume*

FURNACES, INDUSTRIAL

Recuperators. Recuperation—A New Design, E. R. Posnack. Fuels & Furnaces, vol. 1, no. 8, Dec. 1923, pp. 643–645, 3 figs. Describes recuperator designed by author, composed of an arrangement of standardized units so as to be flexible and adaptable to any size of installation; is of hollow tile and can be assembled to form independent air and gas flues.

FURNACES, FORGING

Low-Grade Fuel. Forging Furnaces (Der Schmiedeofen), J. Pitscheder. Werkstattstechnik, vol. 17, no. 22, Nov. 15, 1923, pp. 637–640, 5 figs. Requirements of furnace for economical consumption of fuel and for use of low-grade fuel; describes type of furnace which is said to meet all these demands.

G

GAS ENGINES

Preignition. Pre-Ignition in Gas Engine. Practical Engr., vol. 68, no. 1921, Dec. 20, 1923, pp. 339–340, 3 figs. Some troubles and worries met with in electrical power-house, Napier, New Zealand, and manner in which they were overcome.

Silencing. Silencing Gas Engines, A. Rutherford. Practical Engr., vol. 68, no. 1919, Dec. 6, 1923, pp. 312–313, 4 figs. Divides method for silencing gas engines into two classes, namely, those which employ means whereby gas is expanded, or cooled, and those which aim at maintaining constant flow of gas at any reasonable velocity.

Waste-Heat Utilization. Tests on a Gas-Engine-Driven Generator Set with Waste-Heat Utilization (Betriebsversuche an einer Gasdynamomaschine mit Abhitzeverwertung), M. Steffes. Archiv für Wärmewirtschaft, vol. 4, no. 12, Dec. 1923, pp. 213–217, 16 figs. Gas consumption and steam production for the effective kilowatt-hour; heat balance of gas engine and waste-heat boiler; air of combustion and consumption of cooling water under different engine loads.

GAS PRODUCERS

Ash-Fusion. The Ash-Fusion Type of Gas Producer, M. Servais. Gas & Oil Power, vol. 19, no. 219, Dec. 6, 1923, pp. 39–40. Account of efficiencies obtained in tests made in Belgium.

Design, Improvements in. Modern Gas Producers (Sur la gazéification et les gazogènes industriels), L. Maugé. Revue Industrielle, vol. 53, nos. 24 and 25, Nov. and Dec. 1923, pp. 357–363 and 397–400, 9 figs. Deals with basic action of gas producers and describes latest improvements in producers and in processes for recuperation of hydrocarbons and ammonia; chemical equations for complete and partial combustion of carbon (to CO and CO_2), together with corresponding heats of formation; characteristics of suction and pressure gas producers; typical modern designs.

Wood as Fuel. The Use of Wood in Gas Producers, C. Saxton. Am. Ceramic Soc.—Jl., vol. 6, no. 12, Dec. 1923, pp. 1219–1223. Suggests possibility of using wood as source of gas supply for melting of glass and firing of clay products; comparative results actually obtained with same plant using coal and wood.

GAS TURBINES

Theory. Gas Turbines, J. Deschamps. Engineer, vol. 136, no. 3546, Dec. 14, 1923, pp. 646–647. Observations based on series of articles published in previous issues of same journal.

GEAR CUTTING

Helical Gears. Gear Cutting, R. J. McLeod and T. E. Calderwood. Inst. Mar. Engrs.—Trans., Dec. 1923, pp. 388–410 and (discussion) 410–419, 14 figs. Authors state that tool determines shape of tooth, while machine determines spacing which depends upon master or main dividing wheel of machine; dividing wheel should be as large and as accurate as possible and no additional complication will compensate for initial errors; point out that special feature of "Sykes" machines is that dividing wheels are always larger in diam. than largest gear the machine will cut, so that there is always pro-rata reduction of initial errors.

GEARS

Industry, Development of. Development of the Gear Industry, E. W. Miller. West. Machy. World, vol. 4, no. 12, Dec. 1923, pp. 390–394, 20 figs. Emphasizes advisability and probable necessity of a painstaking inspection of all factors influencing gear industry. Paper read before Am. Gear Mfrs.' Assn. convention.

Machining. Machining Change-Gears, A. Clegg. Mech. World, vol. 74, nos. 1925 and 1928, Nov. 23 and Dec. 14, 1923, and vol. 75, no. 1931, Jan. 4, 1924, pp. 318–319, 366–367, and 2–3, 7 figs. Notes on machining change-gear blanks. Deals with handling, chucking, boring, turning, cutting speeds and feeds for both turning and boring, number of cuts that can proceed simultaneously, etc.

Micarta Silent. Silent Gears for Machine Tools, T. C. Roantree. Machy. (N. Y.), vol. 30, no. 5, Jan. 1924, pp. 363–364, 2 figs. Properties of Micarta gears and applications in machine-tool field.

Railway-Motor. Railway-Motor Gears (Getriebe für Bahnmotoren), H. Mecke. Elektrischer Betrieb, vol. 21, no. 21, Nov. 10, 1923, pp. 233–236, 13 figs. Brief outline of improvements.

Speed-Reduction. Avamore Speed Reduction Gears. Machy. (Lond.), vol. 23, no. 587, Dec. 27, 1923, p. 437, 4 figs. Describes system developed by Avamore Pump Co. of application of epicyclic gearing to reduction gears.

Spiral. Spiral Gearing, Henry E. Merritt. Machy. vol. 23, nos. 579, 580, 583 and 586, Nov. 1, 8, 29 and Dec. 20, 1923, pp. 147–148, 177–179, 273–274 and 393–395, 15 figs. Nov. 1: Relation between shaft angle and spiral angles; end thrust. Nov. 8: Nomenclature and fundamental relations; velocity and force diagrams. Nov. 29: Circle diagrams for spiral angles, axial and transverse forces, and tooth and diameter ratios. Dec. 20: Efficiency, tooth reaction, and design diagrams.

Standardization. Proposed Standardization of Gearing. Machy. (N. Y.), vol. 30, no. 5, Jan. 1924, pp. 374–377, 6 figs. Abstract of report before Am. Gear Mfrs.' Assn.

Teeth, Specially Shaped. The Production of Specially Shaped Gear Teeth, H. E. Stacey. Machy. (Lond.), vol. 23, no. 584, Dec. 6, 1923, pp. 296–299, 5 figs. Milling-machine and hobbing-machine methods; tool design and construction; hob-tool method; method of setting hobbing machine; practical examples.

Tooth Shape and Contact. The Shape of Teeth and Period of Contact on Involute Gears (Zahnform und Eingriffsdauer von Evolventen-Zahnrädern), H. Fischer. Maschinenbau, vol. 2, no. 21, July 26, 1923, pp. G247–G251, 9 figs. Tables and formulas for calculation of tooth shape and period of contact.

Tooth-Shape Standardization. Desiderata for the Standardization of Tooth Shape of Change Wheels (Gesichtspunkte für die Normung der Zahnform von Satzrädern), K. Kutzbach. Maschinenbau, vol. 2, no. 21, July 26, 1923, pp. G233–G240, 16 figs. Calculation of length of contact of gearing and degree of covering with rectilineal face toothing; degree of covering in pure zero gears.

GOVERNORS

High-Speed Steam Engines. The Governing of High-Speed Steam Engines. Power Engr., vol. 19, no. 214, Jan. 1924, pp. 25–27, 3 figs. Notes advocating expansion or cut-off governors, stating case according to experience of W. Sisson & Co.

GUN METAL

Admiralty, Founding. The Founding of Admiralty Gun Metals and Allied Alloys, F. W. Rowe. Foundry Trade Jl., vol. 28, no. 382, Dec. 13, 1923, pp. 508–510, 3 figs. Hardness of bronze and brass; gunmetal alloys; influence of remelting; liquation troubles; casting temperature; gun metal for pressure work; instruments necessary.

H

HAMMERS

Pneumatic. A Simple Pneumatic Hammer for Large and Small Forge Shops (Ein einfacher Lufthammer für die Gross- und Kleinschmiede), G. Bock. Werkstattstechnik, vol. 17, no. 22, Nov. 15, 1923, pp. 632–637, 28 figs. Describes patented Vulkan hammer, in which single oscillating plate serves as valve gear.

HANGARS

Reinforced-Concrete. Hangars on the State Aviation Field in Kbel near Prague (Hangars auf dem staatlichen Flugplatz in Kbel bei Prag), A. Brebera. Beton u. Eisen, vol. 22, nos. 17–18 and 19, Sept. 15 and Oct. 5, 1923, pp. 219–220 and 239–241, 5 figs. Describes construction of three reinforced-concrete hangars.

HARDNESS

Testing Methods. Hardness Tests Research, Instn. Mech. Engrs.—Proc., vol. 1, no. 3, 1923. Includes following papers: Static Indentation Tests, R. G. C. Batson, pp. 401–422, 10 figs. Relation between Width of Scratch and Load on Diamond in the Scratch Hardness Test, G. A. Hankins, pp. 423–449, 17 figs.; and (discussion) pp. 449–487, 12 figs.

HEALTH

Industrial Health-Service Plan. How Do Employees Use the Hospital Facilities? M. R. Lott. Indus. Management (N. Y.), vol. 67, no. 1, Jan. 1924, pp. 58–62, 5 figs. Summation of health-service work at Sperry Gyroscope Co.

HEAT

Conversion of Work into. How to Make Use of Unused Heat with Aid of Power (Wie kann man mit Hilfe von Kraft ungenutzte Wärme nutzbar machen?), J. Kaiser. Zeit. des Bayerischen Revisions-Vereins, vol. 27, nos. 20 and 21–22, Oct. 31 and Nov. 30, 1923, pp. 153–156 and 162–164, 6 figs. Discusses most expedient manner of converting work into heat; theory of process and its application.

HEAT STORAGE

Apparatus for. The Storage of Steam (Die Speicherung von Dampf zum Ausgleich von Feuerungs- und Verbrauchsschwankungen), Ludwig Heuser. Wärme, vol. 46, nos. 22, 23 and 24, June 1, 8 and 15, 1923, pp. 234–236, 247–249 and 257–260, 20 figs. Discusses general aspects in storage of energy, various storage methods and accumulator designs, and certain special applications with accumulator designs most suitable therefor.

Electric Heat Accumulators. Modern Electric Heating (Moderne Elektroheizungen), H. Schneider. Elektrischer Betrieb, vol. 21, no. 23, Dec. 10, 1923, pp. 259–263, 16 figs. Describes more important types of heat accumulators developed by Heat Accumulator Co., Inc., Berlin.

HEAT TRANSMISSION

Principles. Notes on Heat Transmission, D. M'Kerracher. Gas Jl., vol. 164, no. 3162, Dec. 19, 1923, pp. 778–779. What heat is; general principles underlying its mechanism; physical definition of conduction, convection, and radiation.

Theory. Fire and Heat (Le feu, la chaleur), Ch. Roszak. Chaleur & Industrie, vol. 4, nos. 38 and 41, June and Sept. 1923, pp. 515–518 and 624–631. Discusses important aspects of fuel economy and of heat transmission in connection with it.

Tubes. Heat Transmission through Tubes under Variable Temperatures of Liquids (Wärmedurchgang durch Röhren bei veränderlichen Flüssigkeits-temperaturen), H. de Grahl. Wärme, vol. 46, nos. 46 and 47–48, Nov. 23 and 30, 1923, pp. 499–502 and 512–513, 9 figs. Results of experimental investigation; results show that coefficient of transmission is much better with parallel than with countercurrent.

HEAT TREATING

Principles and Applications. Heat Treating—Its Principles and Applications, Chas. H. Fulton, Hugh M. Henton and Jas. H. Knapp. Iron Trade Rev., vol. 73, nos. 14, 16, 18, 20, 22, 24 and 26, Oct. 4, 18, Nov. 1, 15, 29, Dec. 13 and 27, 1923, pp. 943–946 and 950; 1099–1102, 3 figs.; 1240–1244, 12 figs.; 1369–1372, 11 figs.; 1483–1486 and 1493, 4 figs.; 1603–1607, 4 figs.; and 1728–1731, 2 figs.; Oct. 4: Steel and other commercial iron products. Oct. 18, Nov. 1 and 15: Structure of iron and steel. Nov. 29, Dec. 13 and 27: Relation of structure to physical properties.

HEATING, ELECTRIC

Industrial. Electric Heating in Industry (Die Elektrowärme in der Industrie), Fr. Jordan. Elektrischer Betrieb, vol. 21, no. 23, Dec. 10, 1923, pp. 249–252, 7 figs. Application of electric-arc, induction and resistance furnaces in chemical, metallurgical and technical industries, for room heating, etc.

Progress. The Progress in Electrical Heating in the Last Decade (Der Fortschritt der elektrischen Heiztechnik im letzten Jahrzehnt), E. Zeulmann. Elektrotechnik u. Maschinenbau, vol. 41, no. 48, Dec. 2, 1923, pp. 689–696, 13 figs. Review of most important developments, including electrode boiler, storage, heaters, air heaters, improvements in room heating, etc.; electric heating of industrial machinery and its advantages.

HEATING, HOT-AIR

Large Building. Heating a Seven-Acre Building with Warm-Air. Sheet Metal Worker, vol. 14, no. 24, Dec. 21, 1923, pp. 891–893, 5 figs. Describes system installed in Am. Roy. Exposition Bldg. at Kansas City, with seating capacity of 15,000.

Ventilation and. Ventilation and Warm-Air Heating, G. A. Voorhees. Sheet Metal Worker, vol. 14, nos. 3 and 7, Mar. 2 and Apr. 27, 1923, pp. 81–82 and 249–250, 3 figs. Mar. 2: Relation of temperature to ventilation. Apr. 27: Circulation of air as it affects ventilating efficiency of a warm-air heating plant.

HEATING, HOT-WATER

Piping and Fittings Problems. Problems Affecting Hot Water Piping and Fittings in Heating Plants, S. H. Woodbridge. Heat. & Vent. Mag., vol. 20, no. 12, Dec. 1923, pp. 45–47, 3 figs. With special reference to gravity two-pipe systems with overhead supply and to equalization of water flow through riser and drop piping.

HELIUM

Use in Dirigibles. The Use of Helium in Dirigibles, G. A. Crocco. Int. Aeronautics, vol. 1, no. 4, Nov. 1923, pp. 214–215. Calculates annual gas consumption of a dirigible and total tonnage of airships that can be supplied with limited American production of helium.

HOISTS

Mine. Novel Application of Dynamic Braking on Large Slope Hoist, R. W. McNeill. Coal Age, vol. 25, no. 2, Jan. 10, 1924, pp. 35–39, 8 figs. Peculiar requirements of hoisting and lowering speeds under widely differing loads while handling coal, supplies and men necessitates unusual type of control; success of installation at Shenandoah, Pa., proves efficacy of plan.

HOUSING

Industrial Village. Industrial Village on Sound Basis. Iron Age, vol. 113, no. 1, Jan 3, 1924, pp. 9–14, 14 figs. Developments of village established by Kinkora Works of John A. Roebling's Sons Co.; houses for employees only; providing activities outside mill; caring for workers' savings; community services.

Mine and Mill Workers. Housing Workmen at Krupp Mines and Works, H. Hermanns. Coal Industry, vol. 6, no. 12, Dec. 1923, pp. 508–511, 8 figs. Permanent and attractive dwellings provided for employees of organization; low rental charges.

HYDRAULIC TURBINES

Double-Wheel Horizontal. Large Turbines at Swedish Hydro-Electric Stations, F. Johnstone-Taylor. Elec. Times, vol. 64, no. 1677, Dec. 6, 1923, pp. 593–594, 3 figs. Describes large double-wheel horizontal units installed at large power station.

Governor-Pump Operation. Power Supply for Governor Pumps, Ralph Brown. Power, vol. 59, no. 3, Jan. 15, 1924, pp. 92–93, 2 figs. Describes economical system of governor-pump operation.

Low Falls. Hydraulic Turbines for Low Falls, F. Johnstone-Taylor. Power Engr., vol. 19, no. 214, Jan. 1924, pp. 5–7, 4 figs. Describes low-fall Francis turbine; new types of runner; the hydraucone; Banki turbine.

Pelton Wheels. The Genesis of the Pelton Wheel, A. T. Parsons. Am. Mach., vol. 60, no. 2, Jan. 10, 1924, pp. 61–63, 7 figs. How forty-niner and his need for mining equipment developed machine business in San Francisco; modern methods of building large hydaulic turbines.

Raanaasfoss Station, Norway. Turbines at

Manufactured by Advertisers

CLASSIFIED LIST OF MECHANICAL EQUIPMENT

Alphabetical List on page 156

* Taylor Instrument Cos.
* Uehling Instrument Co.
* Westinghouse Electric & Mfg. Co.

Instruments, Scientific
* Taylor Instrument Cos.
Weber, F. Co. (Inc.)

Instruments, Surveying
Dietzgen, Eugene Co.
Electro Sun Co. (Inc.)
Keuffel & Esser Co.
New York Blue Print Paper Co.
ParVell Laboratories
U. S. Blue Co.
Weber, F. Co. (Inc.)

Insulating Materials (Electrical)
* General Electric Co.
Johns-Manville (Inc.)

Insulating Materials (Heat and Cold)
* Celite Products Co.
Johns-Manville (Inc.)
* King Refractories Co. (Inc.)
* Quigley Furnace Specialties Co.

Insulation, Boiler
Carey, Philip Co.

Insulation, Heat
Carey, Philip Co.

Irrigation Systems
* Spray Engineering Co.

Joints, Expansion
* Crane Co.
* Croll-Reynolds Engineering Co.
Hamilton Copper & Brass Works
Lunkenheimer Co.
* Pittsburgh Valve, Fdry. & Const. Co.
* United States Rubber Co.
* Wheeler, C. H. Mfg. Co.

Joints, Flanged Pipe
* Crane Co.
* Pittsburgh Valve, Fdry. & Const. Co.

Joints, Flexible
* Barco Mfg. Co.

Joints, Swing and Swivel
* Barco Mfg. Co.
Lunkenheimer Co.

Kettles, Soda
Manufacturing Equipment & Engrg. Co.

Kettles, Steam Jacketed
* Cole, R. D. Mfg. Co.
* Nordberg Mfg. Co.
* Titusville Iron Works Co.

Keys, Machine
* Smith & Serrell
* Whitney Mfg. Co.

Keyseating Machines
* Whitney Mfg. Co.

Kilns, Dry (Brick, Lumber, Stone, etc.)
* American Blower Co.
* Sturtevant, B. F. Co.

Ladles
Northern Engineering Works
* Whiting Corp'n

Lamps, Incandescent
* General Electric Co.
Johns-Manville (Inc.)
* Westinghouse Electric & Mfg. Co.

Land-Clearing Machinery
Clyde Iron Works Sales Co.

Lathes, Automatic
* Jones & Lamson Machine Co.

Lathes, Brass
* Warner & Swasey Co.

Lathes, Chucking
* Jones & Lamson Machine Co.

Lathes, Engine
* Builders Iron Foundry

Lathes, Turret
* Jones & Lamson Machine Co.
* Warner & Swasey Co.

Levers, Flexible (Wire)
* Gwilliam Co.

Lighting Equipment
* Westinghouse Elect. & Mfg. Co

Linings, Brake
Johns-Manville (Inc.)

Linings, Furnace
* Celite Products Co.
Johns-Manville (Inc.)
* King Refractories Co. (Inc.)
* McLeod & Henry Co.
* Quigley Furnace Specialties Co.

Linings, Stack
Johns-Manville (Inc.)

Loaders, Portable
* Gifford-Wood Co.
Link-Belt Co.

Lockers, Metal
Manufacturing Equip. & Engrg. Co.

Locomotives, Electric
* General Electric Co.
* Westinghouse Electric & Mfg. Co.

Locomotives, Storage Battery
* General Electric Co.
* Westinghouse Electric & Mfg. Co.

Logging Machinery
Clyde Iron Works Sales Co.
Lidgerwood Mfg. Co.

Looms
Fletcher Works

Lubricants
* Dixon, Joseph Crucible Co.
* Royersford Fdry. & Mach. Co.
Vacuum Oil Co.

Lubricating Systems
* Bowser, S. F. & Co. (Inc.)
Lunkenheimer Co.

Lubricators, Cylinder
* Bowser, S. F. & Co. (Inc.)
Lunkenheimer Co

Lubricators, Force-Feed
* Bowser, S. F. & Co. (Inc.)
Lunkenheimer Co.

Lubricators, Hydrostatic
* Crosby Steam Gage & Valve Co.
Lunkenheimer Co.

Lubricators (Sight Feed)
* Crosby Steam Gage & Valve Co.
Lunkenheimer Co.

Machine Tool Feed Control Systems (Oil Pressure)
* American Fluid Motors Co.

Machine Work
* American Machine & Foundry Co.
* Brown, A. & F. Co.
* Builders Iron Foundry
DuPont Engineering Co.
Farrel Foundry & Machine Co.
* Franklin Machine Co.
* Geuder, Paeschke & Frey Co.
Johnson, Carlyle Machine Co.
* Jones, W. A. Fdry. & Mach. Co.
Lammert & Mann Co.
Link-Belt Co.
* Nordberg Mfg. Co.

Machinery
(Is classified under the headings descriptive of character thereof)

Manometers
Bacharach Industrial Instrument Co.
* Simplex Valve & Meter Co.

Mechanical Draft Apparatus
* American Blower Co.
* Clarage Fan Co.
* Coppus Engineering Corp'n
* Green Fuel Economizer Co.
* Sturtevant, B. F. Co.

Mechanical Stokers
(See Stokers)

Metal Treating
* American Metal Treatment Co.

Metals, Perforated
* Hendrick Mfg. Co.

Meters, Air and Gas
Bacharach Industrial Instrument Co.
* Bailey Meter Co.
* Builders Iron Foundry
* General Electric Co.

Meters, Boiler Performance
* Bailey Meter Co.

Meters, Condensation
* Simplex Valve & Meter Co.

Meters, Electric
* General Electric Co.
* Westinghouse Electric & Mfg. Co.

Meters, Feed Water
* Bailey Meter Co.
* Builders Iron Foundry
* General Electric Co.
* H. S. B. W.-Cochrane Corp'n
Hoppes Mfg. Co.
* Simplex Valve & Meter Co.
* Worthington Pump & Machinery Corp'n

Meters, Flow
Bacharach Industrial Instrument Co.
* Bailey Meter Co.
* General Electric Co.
* H. S. B. W.-Cochrane Corp'n
* Simplex Valve & Meter Co.
* Spray Engineering Co.

Meters, Oil
* Bowser, S. F. & Co. (Inc.)
* General Electric Co.
* H. S. B. W.-Cochrane Corp'n
* Simplex Valve & Meter Co.
* Worthington Pump & Machinery Corp'n

Meters, Pitot Tube
* American Blower Co.
* Simplex Valve & Meter Co.

Meters, Steam
* Bailey Meter Co.
* Builders Iron Foundry
* General Electric Co.
* H. S. B. W.-Cochrane Corp'n

Meters, V-Notch
* Bailey Meter Co.
* General Electric Co.
* H. S. B. W.-Cochrane Corp'n

Meters, Venturi
* Builders Iron Foundry
* National Meter Co.
* Simplex Valve & Meter Co.

Meters, Water
* General Electric Co.
* H. S. B. W.-Cochrane Corp'n
Hoppes Mfg. Co.
* National Meter Co.
* Simplex Valve & Meter Co.
* Worthington Pump & Machinery Corp'n

Milling Machines, Hand
* Whitney Mfg. Co.

Milling Machines, Keyseat
* Whitney Mfg. Co.

Milling Machines, Plain
* Warner & Swasey Co.

Mills, Ball
* Allis-Chalmers Mfg. Co.
* Fuller-Lehigh Co.
* Smidth, F. L. & Co.
* Worthington Pump & Machinery Corp'n

Mills, Blooming and Slabbing
Mackintosh-Hemphill Co.

Mills, Grinding
Farrel Foundry & Machine Co.
* Smidth, F. L. & Co.

Mills, Sheet and Plate
Mackintosh-Hemphill Co

Mills, Structural, Rail and Bar
Mackintosh-Hemphill Co.

Mills, Tube
* Allis-Chalmers Mfg. Co.
* Smidth, F. L. & Co.
* Worthington Pump & Machinery Corp'n

Mining Machinery
* Allis-Chalmers Mfg. Co.
* General Electric Co.
* Ingersoll-Rand Co.
* Worthington Pump & Machinery Corp'n

Monel Metal
Driver-Harris Co.
* Geuder, Paeschke & Frey Co.

Monorail Systems
(See Tramrail Systems, Overhead)

Motor-Generators
* Allis-Chalmers Mfg. Co.
* General Electric Co.
Ridgway Dynamo & Engine Co.
* Westinghouse Electric & Mfg. Co.

Motors, Electric
* General Electric Co.
Master Electric Co.
* Sturtevant, B. F. Co.
* Westinghouse Electric & Mfg. Co.

Motors, Synchronous
Ridgway Dynamo & Engine Co.

Mufflers
* Geuder, Paeschke & Frey Co.

Nickel, Sheet
Driver-Harris Co.

Nipple Threading Machines
* Landis Machine Co. (Inc.)

Nitrogen Gas
* Linde Air Products Co.

Nozzles, Aerating
* Spray Engineering Co.

Nozzles, Blast
* Schutte & Koerting Co.

Nozzles, Sand and Air
Lunkenheimer Co.

Nozzles, Spray
* Cooling Tower Co. (Inc.)
* Schutte & Koerting Co.
* Spray Engineering Co.

Odometers
Veeder Mfg. Co.

Ohmeters
* General Electric Co.

Oil and Grease Cups
* Bowser, S. F. & Co. (Inc.)
* Crane Co.
Lunkenheimer Co

Oil and Grease Guns
* Royersford Fdry. & Mach. Co.

Oil Burning Equipment
Bethlehem Shipbldg.Corp'n(Ltd.)
* Combustion Engineering Corp'n
* Schutte & Koerting Co.

Oil Filtering and Circulating Systems
* Bowser, S. F. & Co. (Inc.)
Nugent, Wm. W. & Co. (Inc.)

Oil Mill Machinery
* Worthington Pump & Machinery Corp'n

Oil Refinery Equipment
Bethlehem Shipbldg.Corp'n(Ltd.)
* Vogt, Henry Machine Co.

Oil Storage and Distributing Systems
* Bowser, S. F. & Co. (Inc.)

Oil Well Machinery
* Brownell Co.
* Ingersoll-Rand Co.
* Titusville Iron Works Co.
* Worthington Pump & Machinery Corp'n

Oiling Devices
* Bowser, S. F. & Co. (Inc.)
Lunkenheimer Co.
Nugent, Wm. W. & Co. (Inc.)

Oiling Systems
* Bowser, S. F. & Co. (Inc.)
Lunkenheimer Co.
Nugent, Wm. W. & Co. (Inc.)

Oils, Lubricating
Vacuum Oil Co.

Ore Handling Machinery
* Brown Hoisting Machinery Co.
Chain Belt Co.
Link-Belt Co.

Ovens, Core
* Whiting Corporation

Oxy-Acetylene Supplies
* Linde Air Products Co.

Oxygen Gas
* Linde Air Products Co.

Packing, Ammonia
France Packing Co.
Garlock Packing Co.
* Goodrich, B. F. Rubber Co.
* United States Rubber Co.

Packing, Asbestos
Garlock Packing Co.
* Goodrich, B. F. Rubber Co.
Johns-Manville (Inc.)

Packing, Centrifugal Pump
Garlock Packing Co.

Packing, Hydraulic
France Packing Co.
Garlock Packing Co.
* Goodrich, B. F. Rubber Co.
Johns-Manville (Inc.)

Packing, Metallic
France Packing Co.
Garlock Packing Co.
Johns-Manville (Inc.)

Packing, Rod (Piston and Valve)
France Packing Co.
Garlock Packing Co.
* Goodrich, B. F. Rubber Co.
* Jenkins Bros.
Johns-Manville (Inc.)
* United States Rubber Co.

Packing, Rubber
Garlock Packing Co.
* Goodrich, B. F. Rubber Co.
* Jenkins Bros.
Johns-Manville (Inc.)
* United States Rubber Co.

Packing, Sheet
Garlock Packing Co.
* Goodrich, B. F. Rubber Co.
* Jenkins Bros.
Johns-Manville (Inc.)
* United States Rubber Co.

*Catalogue data of firms marked * appear in the A.S.M.E. Condensed Catalogues of Mechanical Equipment, 1923-24 Volume*

Raanaasfoss Power Station, Hallgrim Thoresen. Can. Engr., vol. 45, nos. 25 and 26, Dec. 18 and 25, 1923, pp. 581–585 and 601–606, 19 figs. Details of hydroelectric power development near Christiania, Norway; six turbines giving total output of 72,000 hp. at 40-ft. head and 107 r.p.m., and a water consumption of 3,200 cu. ft. per sec., details of Voith turbines; efficiency tests; apparatus for measuring water volume.

HYDROELECTRIC DEVELOPMENTS

Bavaria. The Bayernwerk, K. Ruegg. Eng. Progress, vol. 4, no. 11, Nov. 1923, pp. 241–243, 3 figs. Describes system being erected to make supply of electricity to whole of Bavaria as economical as possible; with 110,000-volt network it will be possible to completely utilize available great water power, which for a part can also be accumulated (for present, Walchen Lake and Isar River), so that land which has no coal deposits of its own can decrease import of coal.

California. Pit River Hydro-electric Power Development, C. W. Geiger. Nat. Engr., vol. 27, no. 12, Dec. 1923, pp. 584–586, 2 figs. General description of latest additions to Pacific Gas & Elec. Co.'s system; details of problems faced in construction of plant.

Norway. To Build Three High-Head Power Plants in Norway, E. Svangöe. Eng. New-Rec., vol. 92, no. 3, Jan. 17, 1924, pp. 106–107, 2 figs. Heads up to 3000 ft.; stream flow to be supplemented by storage; many miles of tunnels.

Oregon. Oak Grove Power Project on Clackamas River, W. A. Scott. Eng. World, vol. 23, no. 6, Dec. 1923, pp. 333–337, 11 figs. Construction progress made on hydroelectric project of Portland Ry., Light & Power Co. of Portland, Ore.

Status 1923. Status of Hydro-Electric Construction. Elec. World, vol. 83, no. 1, Jan. 5, 1923, pp. 27–29, 1 fig. 29 projects now being constructed under licenses from Federal Power Commission. California leads in number and horsepower of projects now being developed.

Tasmania. Electricity Supply in Tasmania. Indus. Australian & Min. Standard, vol. 70, no. 1825, Nov. 22, 1923, pp. 785–787, 6 figs. Details of Tasmanian Government hydroelectric scheme; equipment now provided is capable of output of 63,000 hp. which is available for use of industrial undertakings established in the island.

United States, 1923. Hydro-Electric Development Shows Unprecedented Activity. Power, vol. 59, no. 1, Jan. 1, 1924, pp. 12–16, 8 figs. Over 2,000,000 horsepower of new hydroelectric plants and extensions to old installations, in projects of 10,000 hp. and larger, were completed during 1923 or are now under construction in United States.

HYDROELECTRIC PLANTS

Accumulating Plant. Hydroelectric Accumulating Plant of the Firm "Manufactures Hartmann et Fils," Münster, Alsace (Hydroelektrische Akkumulierungsanlage der Firma Manufactures Hartmann et Fils, Munster i. Els.), E. Rabner. Siemens-Zeit., vol. 3, no. 11, Nov. 1923, pp. 499–506, 11 figs. Details of hydroelectric storage plant, built by firm of Locher, Zurich; electrical equipment supplied by Siemens-Schuckert Works.

Canada. An Important Northern Power Plant, H. L. Sanborn. Elec. News, vol. 32, no. 23, Dec. 1, 1923, pp. 58–60, 6 figs. Hydroelectric development of Abitibi Power & Paper Co.; notes on water control, switching control, transmission lines, substations, and mill feeders.

Hydraulic Machinery. Hydroelectric Plants and Hydraulic Machinery (Wasserkraftanlagen und Wasserkraftmaschinen), A. Budau. Zeit. des Oesterr. Ingenieur- u. Architekten-Vereines, vol. 75, no. 31–32, Aug. 10, 1923, pp. 186–197, 18 figs. High-pressure plants: older and more recent hydroelectric-plant arrangements; corrosion and its prevention; Pelton vs. Francis turbine. Medium-pressure plants: Esibe control method; ice difficulties. Low-pressure plants: development of high-speed turbines; Storek-Kaplan turbine; horizontal and vertical shaft; modern draft tubes; pros and cons of high-speed turbine.

Miniature. A Miniature Water-Power Installation, D. C. Miller. Elec. Rev., vol. 93, no. 2405, Dec. 28, 1923, pp. 969–971, 6 figs. An 85-volt 550-watt capacity plant.

Sweden. Power Station at Forshuvudforsen (Bergslagets nya Kraftwerk vid Forshuvudforsen), M. Serrander. Teknisk Tidskrift (Väg- och Vattenbyggnadskonst), vol. 53, no. 43, Oct. 27, 1923, pp. 145–155, 27 figs. New power station in Dalälven in Sweden, built by Stora Kopparbergs Aktiebolag, is arranged for three units, each of 8000 hp., two of which are already in operation; water wheels are constructed for 83⅓ r.p.m., at which they are warranted to have efficiency of 86 per cent for water consumption of 60 cu. m. per sec.; generators are rated at 6500 kva., 11,000 volts and 50 cycles.

I

IMPACT TESTING

Notched-Bar Tests. Notch Action in Upsetting Test (Ueber Kerbwirkungen beim Stauchversuch), G. Sachs. Stahl u. Eisen, vol. 43, no. 52, Dec. 27, 1923, p. 1587, 3 figs. Tests on cast-iron specimens; relations between notch diameter and breaking load.

Theory and Practice of the Notched-Bar Test (Theorie und Praxis der Kerbschlagprobe), P. Fillunger. Schweizerische Bauzeitung, vol. 82, nos. 21 and 22, Nov. 24 and Dec. 1, 1923, pp. 265–268 and 284–289, 18 figs. Impact process is divided into four impact periods, each of which is discussed; experimental examination of theory.

INDUSTRIAL MANAGEMENT

Factories. Rational Works Management in Factories, J. A. Davenport and J. I. Emery. Indus. Management (Lond.), vol. 9, nos. 9, 10, 11, 12, 13, and vol. 10, nos. 1, 2, 4, 5, 9 and 12, May 3, 17, 31, June 14, 28, July 12, 26, Aug. 23, Sept. 6, Nov. 15 and Dec. 13, 1923, pp. 259–260, 291–294, 323–325, 355–356, 387–389, 3–4, 37–40, 93–94, 119–120, 270–272, and 326–327, 9 figs. May 3: Need for sound organization and sane administration. May 17: Factory personnel. May 31 and June 14: Scope and limitations of works management. June 28 and July 12: Scientific management. July 26: Standardization. Aug. 23: Labor-saving devices. Sept. 6: Inspection methods. Nov. 15: Training. Dec.: Payment by results.

Planning. Planning the Repetitive Manufacture of Automobile Wheels, Wm. B. Ferguson. Management & Administration, vol. 7, no. 1, Jan. 1924, pp. 31–38, 70 figs. Methods used in quantity production or making of great number of parts of same design with respect to those features which are more or less peculiar to this class of work.

Production and Sales, Coördination. Coordination of Production with Sales for Oil Companies. E. G. Reynolds. Management & Administration, vol. 7, no. 1, Jan. 1924, pp. 85–89, 2 figs. Setting production schedule; adjustment of estimated production and sales; interpretation of revised quota; types of records necessary to execute plan; regulation of refinery operations.

Purchasing. The Science of Buying Material, P. M. Atkins. Indus. Management (N. Y.), vol. 67, no. 1, Jan. 1924, pp. 19–23. Notes on purchasing agent's contribution to smooth production flow.

Scientific. The Art of Management, O. Sheldon. Taylor Soc.—Bul., vol. 8, no. 6, Dec. 1923, pp. 209–214. A British point of view.

Statistical Methods in Business. The Present Status of Statistical Research in the Administration of Business, C. L. Sweeting and D. K. Pfeffer. Taylor Soc.—Bul., vol. 8, no. 6, Dec. 1923, pp. 215–218. Results of authors' attempt to ascertain extent to which precise statistical procedures are being used as aids in stabilization of business; compilation of answers to questionnaire.

INDUSTRIAL RELATIONS

Economic Courses for Employees. Increased Industrial Acquaintanceship. Iron Age, vol. 113, no. 3, Jan. 17, 1924, pp. 211–214. 5 figs. Progress in 1923 in relations with employees at plant of Bridgeport Brass Co., Bridgeport, Conn.; courses in economics to explain business problems; service club; pensions to superannuated employees; group insurance plan.

Scientific Management and Labor. Two Pioneer Papers on Industrial Relations, Rob. G. Valentine. Taylor Soc.—Bul., vol. 8, no. 6, Dec. 1923, pp. 225–236, 1 fig. Reprint of following articles: Scientific Management and Organized Labor; and The Progressive Relation between Efficiency and Consent, published originally in 1914 and 1915, respectively.

INSPECTION

Industrial. Industrial Inspection. Int. Labour Rev., vol. 8, no. 6, Dec. 1923, pp. 915–929. Factory inspection in Great Britain in 1922; industrial inspection in Victoria, Sweden, and Netherlands.

INTERNAL-COMBUSTION ENGINES

Constant-Compression. The Essentials of a Successful Constant-Compression Engine, C. E. Sargent. Soc. Automotive Engrs.—Jl., vol. 14, no. 1, Jan. 1924, pp. 5–10, 9 figs. It is shown that constant-compression engines in which throttling is eliminated are feasible in construction; permit admitting of inert gas at less that full load during first part of induction stroke and of burnable gas during last part; describes new type developed to prove that engine could be designed to maintain constant compression and mean effective pressure commensurate with load.

Cooling, Influence of. The Influence of Cooling of Internal-Combustion Engines on Efficiency (Der Einfluss der Kühlung der Verbrennungsmaschinen auf die Leistung), W. Schlachter. Maschinenbau, vol. 2, no. 20, July 13, 1923, pp. B241–B243, 8 figs. Discusses influence of cooling losses and measures for reducing them and increasing efficiency of engine.

Crankless. Crankless Internal Combustion Engine. Indus. Australian & Min. Standard, vol. 70, no. 1824, Nov. 15, 1923, pp. 746–747, 3 figs. Technical particulars of 8-cylinder crankless engine, 3.312-in. bore by 3.51-in. stroke; 35.1 rated horsepower (S. A. E.).

Cylinder Head, Shape of. The Shape of Internal-Combustion Engines (Beitrag zur Gestaltung von Verbrennungsmotoren), H. G. Bäder. Maschinenbau, vol. 2, no. 20, July 13, 1923, pp. G217–G220, 5 figs. Calculation of heat accumulations and losses on circumference of cylinder-head openings, showing that number and shape of openings have more influence on operating safety of cylinder heads than absolute degree of heat load.

Heat Losses. Heat Losses in Internal-Combustion Engines (Die Wärmeverluste in Verbrennungsmotoren), H. Schmolke. Wärme, vol. 46, no. 45, Nov. 9, 1923, pp. 489–491. Review of latest investigations of temperature, heat absorption and heat transmission in gas engines.

Heat Transmission in. Heat Transmission in Internal-Combustion Engines (Der Wärmeübergang in der Verbrennungskraftmaschine), Wilhelm Nusselt. Forschungsarbeiten auf dem Gebiete des Ingenieurwesens, no. 264, 1923, 79 pp., 15 figs. Discusses measurement of power of reflection of internal spherical surface; theory of heat radiation of hot gases; calculation of heat radiation based on tests; tests and their results; comparison with earlier tests and study of play of piston.

Ignition Patents. Internal-Combustion Engines, Igniting in. Abridgments of Specifications (Lond.), Class 7 (iv), 1923, Period—A. D. 1916–20, 129 pp. Patents for inventions.

Temperature and Thermal Stresses. The Course of Temperature and Thermal Stresses in Internal-Combustion Engines (Temperaturverlauf und Wärmespannungen in Verbrennungsmotoren), G. Eichelberg. Forschungsarbeiten auf dem Gebiete des Ingenieurwesens, no. 234, 1923, 46 pp., 24 figs. on supp. plates. Deals with temperature of gases and heat transmission; course of temperature and thermal stresses in cylinder walls.

[See also AIRPLANE ENGINES; AUTOMOBILE ENGINES; DIESEL ENGINES; GAS ENGINES; OIL ENGINES.]

IRON

Carbonizing with Oxy-Acetylene Flame. Surface Hardening with Oxy-Acetylene Flame, J. F. Springer. Ry. Mech. Engr., vol. 98, no. 1, Jan. 1924, pp. 36–37. Points out that torch process will mark out for itself field sharply defined and superior to its competitors; limitations of oxy-acetylene carbonizing; main advantages of torch process; experiments on cast steel.

IRON AND STEEL

Corrosion. The Corrosion of Iron and Steel, J. Newton Friend. Chem. Trade Jl. & Chem. Engr., vol. 73, no. 1909, Dec. 21, 1923, p. 734. J. N. Friend's colloid theory. Abstract of paper read before Hull Chem. & Eng. Soc., Dec. 11, 1923.

IRON CASTINGS

Bearing Brackets. Practical Problems of Casting and Patternmaking (Praktische Betriebsfragen aus der Giesserei und Modelltischlerei). Giesserei-Zeitung, vol. 20, no. 24, Nov. 15, 1923, pp. 463–466, 6 figs. Deals with cast-iron bearing brackets for electric machines, their casting faults, causes and prevention.

Hardness, Causes of. Physical Factors Affect Iron, J. H. Hopp. Automotive Industries, vol. 50, no. 1, Jan. 3, 1924, pp. 11–12. Hard castings ascribed to chemical content in many cases are due to causes other than metal; shrinkage alleviated by proper gates and risers. (Abstract.) Paper before Chicago Foundrymen's Club.

Shrinkage and Cavities. Shrinkage and Cavities in Iron Castings, Engineering, vol. 116, no. 3026, Dec. 28, 1923, p. 809. Study of relations between formation of cavities in cast iron and composition and pouring temperatures of material. (Abstract.) Translated from Stahl u. Eisen, Sept. 27.

Titanium in. Titanium in Gray Iron Castings (Ueber Titan im Grauguss), E. Piwowarsky. Stahl u. Eisen, vol. 43, no. 49, Dec. 6, 1923, pp. 1491–1494, 7 figs. Critical discussion of earlier tests and works on influence of titanium; account of author's tests and results.

J

JIGS

Drill. Single v. Multiple-operation Jigs, C. J. Williams. Machy. (Lond.), vol. 23, no. 585, Dec. 13, 1923, pp. 329–331, 5 figs. Problem in drill jig design.

L

LATHES

Balance and Cutting Tests. Investigation of Turning (Die Untersuchung der Dreharbeit), H. Klopstock. Werkstattstechnik, vol. 17, nos. 23 and 24, Dec. 1 and 15, 1923, pp. 645–654 and 666–672, 44 figs. Calculation of balance of lathe; law of cutting process; development of new cutting form; analysis of cutting process.

Turret. 7 and 8½-inch Centre Combination Turret Lathes. Machy. (Lond.), vol. 23, no. 586, Dec. 20, 1923, pp. 396–399, 8 figs. New developments by H. W. Ward & Co., Birmingham.

LIFTING MAGNETS

Types and Applications. Load-Lifting Equipment for Cranes (Die Lastaufnahmemittel der Krane), R. Hänchen. Mashinenbau, vol. 3, no. 1, Oct. 11, 1923, pp. G1–G2, 4 figs. Types and main uses of lifting magnets.

LOCOMOTIVE BOILERS

Design. Locomotive Type Boilers. Power Plant Eng., vol. 28, no. 1, Jan. 1, 1924, p. 27, 1 fig. Losses due to air leakage and radiation reduced to minimum.

LOCOMOTIVES

Electric. See ELECTRIC LOCOMOTIVES.

50-Per cent Cut-Off. The Fifty Per Cent Cut-Off Locomotive, W. F. Kiesel, Jr. N. Y. R. R. Club, vol. 34, no. 1, Dec. 1923, pp. 7138–7151, 6 figs. Describes locomotive which in expansion ratio approximates compound locomotive, in uniformity of torque practically equals three-cylinder locomotive, and in simplicity of parts is same as ordinary two-cylinder locomotives; advantages, and tests made.

4-6-0. Four-Cylinder 4–6–0-Type Locomotive; Great Western Railway. Engineering, vol. 116, no. 3024, Dec. 14, 1923, pp. 742–743, 6 figs. partly on supp. plate. Particulars of new express locomotives turned out at Swindon Works.

Freight-Tonnage Ratings. Locomotive Freight Tonnage Ratings, W. U. Appleton. Can. Ry. & Mar.

Manufactured by Advertisers

CLASSIFIED LIST OF MECHANICAL EQUIPMENT

Alphabetical List on page 156

Paints, Concrete (For Industrial Purposes)
Smooth-On Mfg. Co.

Paint, Metal
* Dixon, Joseph Crucible Co.
* General Electric Co.
Johns-Manville (Inc.)

Panel Boards
* Westinghouse Elect. & Mfg. Co.

Pans, Drip
* Geuder, Paeschke & Frey Co.

Pans, Vacuum
* Geuder, Paeschke & Frey Co.

Paper, Drawing
Dietzgen, Eugene Co.
Electro Sun Co. (Inc.)
Keuffel & Esser Co.
New York Blue Print Paper Co.
ParVell Laboratories
U. S. Blue Co.
Weber, F. Co. (Inc.)

Paper Mill Machinery
Farrel Foundry & Machine Co.

Paper, Sensitized
Dietzgen, Eugene Co.
Electro Sun Co. (Inc.)
Keuffel & Esser Co.
New York Blue Print Paper Co.
ParVell Laboratories
U. S. Blue Co.
Weber, F. Co. (Inc.)

Paraffine Wax Plant Equipment
Bethlehem Shipbldg.Corp'n(Ltd.)
* Vogt, Henry Machine Co.

Pasteurizers
* Vilter Mfg. Co.

Pattern Work
* American Machine & Foundry Co.
DuPont Engineering Co.

Pencils, Drawing
American Lead Pencil Co.
Dietzgen, Eugene Co.
* Dixon, Joseph Crucible Co.
Electro Sun Co. (Inc.)
Keuffel & Esser Co.
New York Blue Print Co.
ParVell Laboratories
U. S. Blue Co.
Weber, F. Co. (Inc.)

Penstocks
Smith, S. Morgan Co.

Pile Drivers
Clyde Iron Works Sales Co.
Lidgerwood Mfg. Co.

Pinions, Rolling Mill
Mackintosh-Hemphill Co.

Pinions, Steel
* General Electric Co.

Pipe, Cast Iron
* Builders Iron Foundry
* Central Foundry Co.
* U. S. Cast Iron Pipe & Fdry. Co.

Pipe, Riveted
* American Spiral Pipe Wks.
* Springfield Boiler Co.
Steere Engineering Co.
* Titusville Iron Works Co.
* Walsh & Weidner Boiler Co.

Pipe, Soil
* Central Foundry Co.

Pipe, Steel
* Crane Co.
Steere Engineering Co.

Pipe, Welded
* American Spiral Pipe Wks.
* Crane Co.
* Pittsburgh Valve, Fdry. & Const. Co.
Steere Engineering Co.

Pipe, Wrought Iron
Byers, A. M. Company
* Crane Co.

Pipe Coils, Covering, Fittings, etc.
(See Coils, Covering, Fittings, etc., Pipe)

Pipe Cutting and Threading Machines
* Crane Co.
* Landis Machine Co. (Inc.)

Pipe Threading Machines
Treadwell Engineering Co.

Piping, Ammonia
* Frick Co. (Inc.)

Piping, Power
* Crane Co.
* Pittsburgh Valve, Fdry. & Const. Co.
Steere Engineering Co.
* Vogt, Henry Machine Co.

Pitot Tubes
(See Tubes, Pitot)

Planimeters
* American Schaeffer & Budenberg Corp'n
* Bristol Co.
* Crosby Steam Gage & Valve Co.
Dietzgen, Eugene Co.
Electro Sun Co. (Ltd.)
Keuffel & Esser Co.
New York Blue Print Co.
ParVell Laboratories
U. S. Blue Co.
Weber, F. Co. (Inc.)

Plate Metal Work
(See Steel Plate Construction)

Pointers, Bolt
* Landis Machine Co. (Inc.)

Polishing Machinery
* Builders Iron Foundry
* Royersford Fdry. & Mach. Co.

Powdered Fuel Equipment (for Boiler and Metallurgical Furnaces)
* Allis-Chalmers Mfg. Co.
* Combustion Engineering Corp'n
* Fuller-Lehigh Co.
Grindle Fuel Equipment Co.
* Quigley Furnace Specialties Co.
* Smidth, F. L. & Co.
* Worthington Pump & Machinery Corp'n

Power Transmission Machinery
* Allis-Chalmers Mfg. Co.
* Brown, A. & F. Co.
Chain Belt Co.
* Falls Clutch & Machinery Co.
Farrel Foundry & Machine Co.
* Franklin Machine Co.
* General Electric Co.
* Hyatt Roller Bearing Co.
* Jones, W. A. Fdry. & Mach. Co.
Link-Belt Co.
* Medart Co.
* Morse Chain Co.
* Royersford Fdry. & Mach. Co.
* Smidth, F. L. & Co.
Smith, S. Morgan Co.
* Woods, T. B. Sons Co.

Presses, Baling
* Franklin Machine Co.
Philadelphia Drying Mchry. Co.

Presses, Draw
* Niagara Machine & Tool Works

Presses, Extruding
Farrel Foundry & Machine Co.

Presses, Foot
* Royersford Fdry. & Mach. Co.

Presses, Forming
Farrel Foundry & Machine Co.

Presses, Hydraulic
* Falls Clutch & Machinery Co.
Farrel Foundry & Machine Co.
Mackintosh-Hemphill Co.
Philadelphia Drying Mchry. Co.

Presses, Punching and Trimming
Long & Allstatter Co.
* Niagara Machine & Tool Works
* Royersford Fdry. & Mach. Co.

Presses, Sheet Metal Working
* Niagara Machine & Tool Works

Presses, Toggle
* Niagara Machine & Tool Works

Presses, Wax
* Vogt, Henry Machine Co.

Pressure Gages, Regulators, etc.
(See Gages, Regulators, etc., Pressure)

Producers, Gas
* De La Vergne Machine Co.
Otto Engine Works
* Westinghouse Electric & Mfg. Co.
* Worthington Pump & Mchry. Corp'n

Projectors, Flood Lighting
* Westinghouse Elect. & Mfg. Co.

Propellers
* Morris Machine Works

Pulleys, Friction Clutch
* Allis-Chalmers Mfg. Co.
* Brown, A. & F. Co.
* Falls Clutch & Machinery Co.
Johnson, Carlyle Machine Co.
* Jones, W.A. Fdry. & Mach. Co.
Link-Belt Co.
* Medart Co.
* Wood's, T. B. Sons Co.

Pulleys, Iron
* Brown, A. & F. Co.
Chain Belt Co.
* Falls Clutch & Machinery Co.
* Gifford-Wood Co.
* Jones, W. A. Fdry. & Mach. Co.
Link-Belt Co.
* Medart Co.
* Wood's, T. B. Sons Co.

Pulleys, Paper
Rockwood Mfg. Co.

Pulleys, Steel
* Medart Co.

Pulleys, Wood
* Medart Co.

Pulling Tables (For Annealing Furnaces)
* Kenworthy, Chas. F. (Inc.)

Pulverizers
* Brown, A. & F. Co.
* Fuller-Lehigh Co.
* Smidth, F. L. & Co.

Pulverizers, Cement Materials
Pennsylvania Crusher Co.

Pulverizers, Coal
Grindle Fuel Equipment Co.
Pennsylvania Crusher Co.

Pulverizers, Limestone
Pennsylvania Crusher Co.

Pump Governors, Valves, etc.
(See Governors, Valves, etc. Pump)

Pumping Engines
(See Engines, Pumping)

Pumping Systems, Air Lift
* Ingersoll-Rand Co.

Pumps, Acid
Buffalo Steam Pump Co.
* Ingersoll-Rand Co.
* Nordberg Mfg. Co.
Taber Pump Co.
* Titusville Iron Works Co.

Pumps, Air
* Goulds Mfg. Co.
* Ingersoll-Rand Co.
* Westinghouse Electric & Mfg. Co.
* Wheeler, C. H. Mfg. Co.

Pumps, Ammonia
Buffalo Steam Pump Co.
* Goulds Mfg. Co.
* Ingersoll-Rand Co.
* Vogt, Henry Machine Co.
* Worthington Pump & Machinery Corp'n

Pumps, Boiler Feed
* Allis-Chalmers Mfg. Co.
Buffalo Steam Pump Co.
* Coppus Engineering Corp'n
* De Laval Steam Turbine Co.
* Goulds Mfg. Co.
* Ingersoll-Rand Co.
* Kerr Turbine Co.
* Wheeler, C. H. Mfg. Co.
* Worthington Pump & Machinery Corp'n

Pumps, Centrifugal
* Allis-Chalmers Mfg. Co.
Buffalo Steam Pump Co.
* Cramp, Wm. & Sons Ship & Engine Bldg. Co.
* De Laval Steam Turbine Co.
* Goulds Mfg. Co.
* Ingersoll-Rand Co.
* Kerr Turbine Co.
Lammert & Mann Co.
* Morris Machine Works
* Nordberg Mfg. Co.
Taber Pump Co.
* Westinghouse Electric & Mfg. Co.
* Wheeler, C. H. Mfg. Co.
* Wheeler Cond. & Engrg. Co.
* Worthington Pump & Machinery Corp'n

Pumps, Condensation
Buffalo Steam Pump Co.
* Ingersoll-Rand Co.
* Wheeler, C. H. Mfg. Co.

Pumps, Deep Well
* Allis-Chalmers Mfg. Co.
* Goulds Mfg. Co.
* Ingersoll-Rand Co.
* Morris Machine Works
* Worthington Pump & Machinery Corp'n

Pumps, Dredging
* Ingersoll-Rand Co.
* Morris Machine Works
* Worthington Pump & Machinery Corp'n

Pumps, Electric
* Allis-Chalmers Mfg. Co.
Buffalo Steam Pump Co.
* Goulds Mfg. Co.
* Ingersoll-Rand Co.
* Morris Machine Works
* Nordberg Mfg. Co.
Taber Pump Co.
* Worthington Pump & Machinery Corp'n

Pumps, Elevator
Buffalo Steam Pump Co.
* Goulds Mfg. Co.
* Worthington Pump & Machinery Corp'n

Pumps, Filter Press
Buffalo Steam Pump Co.
* Goulds Mfg. Co.

Pumps, Hand
* Goulds Mfg. Co.
Taber Pump Co.

Pumps, Hydraulic
* American Fluid Motors Co.
Farrel Foundry & Machine Co.

Pumps, Hydraulic Pressure
Buffalo Steam Pump Co.
* Goulds Mfg. Co.
* Ingersoll-Rand Co.
* Morris Machine Works
* Worthington Pump & Machinery Corp'n

Pumps, Measuring
Wayne Tank & Pump Co.

Pumps, Measuring (Gasoline or Oil)
* Bowser, S. F. & Co. (Inc.)

Pumps, Oil
* Bowser, S. F. & Co. (Inc.)
Buffalo Steam Pump Co.
* Goulds Mfg. Co.
* Ingersoll-Rand Co.
Lunkenheimer Co.
Nugent, Wm. W. & Co. (Inc.)
Taber Pump Co.
* Worthington Pump & Machinery Corp'n

Pumps, Oil, Force-Feed
* Bowser, S. F. & Co. (Inc.)
* Goulds Mfg. Co.
Lunkenheimer Co.

Pumps, Oil (Hand)
* Bowser, S. F. & Co. (Inc.)
* Goulds Mfg. Co.
Lunkenheimer Co.
Nugent, Wm. W. & Co. (Inc.)

Pumps, Power
* Allis-Chalmers Mfg. Co.
Bethlehem Shipbldg.Corp'n(Ltd.)
Buffalo Steam Pump Co.
* Goulds Mfg. Co.
* Ingersoll-Rand Co.
* Nordberg Mfg. Co.
* Wheeler Cond. & Engrg. Co.
* Worthington Pump & Machinery Corp'n

Pumps, Rotary
* Goulds Mfg. Co.
Lammert & Mann Co.
Taber Pump Co.

Pumps, Steam
* Allis-Chalmers Mfg. Co.
Buffalo Steam Pump Co.
* Ingersoll-Rand Co.
* Nordberg Mfg. Co.
* Wheeler, C. H. Mfg. Co.
* Wheeler Cond. & Engrg. Co.
* Worthington Pump & Machinery Corp'n

Pumps, Sugar House
* Allis-Chalmers Mfg. Co.
Buffalo Steam Pump Co.
* Goulds Mfg. Co.
* Ingersoll-Rand Co.
* Worthington Pump & Machinery Corp'n

Pumps, Sump
Buffalo Steam Pump Co.
* Goulds Mfg. Co.
* Ingersoll-Rand Co.
* Morris Machine Works
* Smidth, F. L. & Co.
Taber Pump Co.

Pumps, Tank
Buffalo Steam Pump Co.
* Goulds Mfg. Co.
* Ingersoll-Rand Co.
Taber Pump Co.
* Wheeler, C. H. Mfg. Co.
* Wheeler Cond. & Engrg. Co.
* Worthington Pump & Machinery Corp'n

Pumps, Turbine
* Allis-Chalmers Mfg. Co.
Buffalo Steam Pump Co.
* De Laval Steam Turbine Co.
* General Electric Co.
* Goulds Mfg. Co.
* Ingersoll-Rand Co.
* Kerr Turbine Co.
* Morris Machine Works
* Westinghouse Electric & Mfg. Co.
* Worthington Pump & Machinery Corp'n

Pumps, Vacuum
Buffalo Steam Pump Co.
* Croll-Reynolds Engrg. Co. (Inc.)
* Goulds Mfg. Co.
* Ingersoll-Rand Co.
Lammert & Mann Co.
* Nordberg Mfg. Co.
* Wheeler, C. H. Mfg. Co.
* Wheeler Cond. & Engrg. Co.
* Worthington Pump & Machinery Corp'n

Punches, Multiple
* Long & Allstatter Co.
Mackintosh-Hemphill Co.

Punches, Power
* Niagara Machine & Tool Works
* Royersford Fdry. & Mach. Co.

*Catalogue data of firms marked * appear in the A.S.M.E. Condensed Catalogues of Mechanical Equipment, 1923-24 Volume*

World, no. 310, Dec. 1923, pp. 565–569, 5 figs. Discusses the two main factors governing correct tonnage rating for a specified subdivision, viz., drawbar pull exerted by locomotive, and resistance of train, and the minor factors influencing these.

Great Britain, 1923. British Locomotives of 1923. Engineer, vol. 137, no. 3549, Jan. 4, 1924, pp. 6–7, 6 figs. partly on supp. plate. Review of developments.

Heavy Freight. Heavy 2–10–2 Type Locomotive, B. & O. R. R. Ry. Rev., vol. 73, no. 25, Dec. 22, 1923, pp. 889–890, 1 fig. Locomotive designed to combine speed capacity of road's Mikado-type heavy road engine with exceptional hauling capacity.

Internal-Combustion. A 38/40 Hp. Internal-Combustion Locomotive for the Gold Coast Railway. Ry. Gaz., vol. 39, no. 26, Dec. 28, 1923, pp. 813 and 826, 2 figs. Details of a 3-ft. 6-in. gage locomotive built for use in connection with Takoradi Harbor scheme; 0–4–0 type; fitted with two-speed gear in each direction; wheelbase 4 ft.

Mikado. Canadian National Mikado Type Locomotive, C. E. Brooks. Ry. Mech. Engr., vol. 98, no. 1, Jan. 1924, pp. 6–9, 7 figs. Belpaire fireboxes and extended side sheets reduce troubles from bad water in Western Canada.

Performance. Some British Locomotive Performances, J. T. Burton-Alexander. Engineer, vol. 136, no. 3548, Dec. 28, 1923, pp. 684–685. Account of runs on British railways which date back to about 20 years ago.

Production Statistics, 1923. Record-Breaking Increase in Motive Power. Ry. Age, vol. 76, no. 1, Jan. 5, 1924, pp. 77–82. Gives table of locomotive orders for 1923 for service in United States.

Shipment by Water. The Shipment of Locomotives to India. Engineering, vol. 116, no. 3026, Dec. 28, 1923, pp. 802–804, 6 figs. partly on p. 806. Describes methods employed by Armstrong, Whitworth & Co. in shipping locomotives to Calcutta without dismantling.

Steam-Turbine. The Steam Turbine as Locomotive Drive (Die Dampfturbine als Lokomotivantrieb), U. R. Ruegger. Schweizerische Bauzeitung, vol. 82, no. 23, Dec. 8, 1923, pp. 299–303, 9 figs. Discusses most important types of steam-turbine locomotives, including Ramsay, Zoelly and Ljungström locomotives.

Tank. Powerful 2–6–4 Type Tank Locomotives for the Bombay, Baroda & Central India Railway. Ry. Gaz., vol. 39, no. 25, Dec. 21, 1923, p. 794, 2 figs. Dimensions and principal data.

10-Wheel. Pennsylvania Ten-Wheel Passenger Locomotive. Ry. Mech. Engr., vol. 98, no. 1, Jan. 1924, pp. 16–18, 3 figs. Class G5S, new design for local passenger service with 68-in. drivers, develops 41,328-lb. tractive force.

LUBRICANTS

Railroad Engine Greases. The Manufacture of Railroad Engine Greases, H. L. Kauffman. Ry. Mech. Engr., vol. 98, no. 1, Jan. 1924, pp. 13–14. Discusses materials and processes entering into production of these lubricants.

LUBRICATING OILS

Testing. A New and Universal Method of Testing Lubricating Oil (Eine neue einfache und universelle Schmierölprüfweise), H. Dallwitz-Wegner. Petroleum, vol. 19, no. 35, Dec. 10, 1923, pp. 1247–1253, 9 figs. Describes improved method of measuring capillary properties.

LUBRICATION

Bearings. Oil and Bearing Tests in Machine Laboratory of the German National Physico-Technical Institute (Ueber Oel- und Lagerversuche im Maschinenlaboratorium der Physikalisch-Technischen Reichsanstalt), V. Vieweg. Glasers Annalen, vol. 93, no. 10, Nov. 15, 1923, pp. 111–113, 6 figs. Describes optical method of investigating film formation of lubricating medium in a bearing.

The Lubrication of Bearings (Die Schmierung von Oellagern), A. Michels. Zeit. des Vereines deutscher Ingenieure, vol. 67, no. 49, Dec. 8, 1923, pp. 1100–1103, 17 figs. Study of theory of lubrication; so-called equation of Osborne Reynolds is derived according to Sommerfeld method, from which conclusions are drawn for production of bearings.

LUMBER

Size and Grade Standardization. Standardized Sizes and Grades for Lumber. Contract Rec. & Eng. Rev., vol. 37, no. 48, Nov. 28, 1923, pp. 1125–1127. Recommendations formulated by committee, covering standard lumber classification, standard grade names and classifications, standard yard lumber sizes, method of lumber measurement, standard shipping weights and shipping and other provisions, which it is anticipated will be accepted by the industry.

M

MACHINE SHOPS

Repair Orders. That Repair Order, H. S. Riggs. Am. Mach., vol. 59, no. 26, Dec. 27, 1923, pp. 933–938, 7 figs. System of handling repair orders quickly, without necessitating personal attention, as practiced in plant of Lodge & Shipley Machine Tool Co., Cincinnati, O.

MACHINE TOOLS

Adjustments. Adjustments on Machine Tools, F. Horner. British Machine Tool Eng., vol. 2, no. 24, Nov.-Dec. 1923, pp. 719–724, 12 figs. Discusses class of adjusting devices that deals with the various movements essential to operation of a machine and brings slides, tables, spindles, heads, steadies, and other elements into suitable positions, and the various points that arise in connection therewith.

Developments 1923. Machine Tool Developments in 1923. Machy. (Lond.), vol. 23, no. 585, Dec. 13, 1923, pp. 345–376, 48 figs. Review of year's progress, featuring principal improvements in machine-tool design.

Principal Developments in Shop Equipment, L. C. Morrow. Am. Mach., vol. 60, no. 3, Jan. 17, 1924, pp. 81–111, 213 figs. Semi-annual résumé of machines, tools and accessories described in Shop Equipment News section of this journal during last six months of 1923. See also Index of Manufacturers, pp. 112–114.

Plate and Bar-Working. Plate and Bar-working Tools. Machy. (Lond.), vols. 22 and 23, nos. 561, 562, 564, 565, 567, 568, 570, 572, 574, 578, 581, 582 and 587, June 28, July 5, 19, 26, Aug. 9, 16, 30, Sept. 13, 27, Oct. 25, Nov. 15, 22 and Dec. 27, 1923, pp. 389–395, 429–437, 511–516, 541–547, 589–593, 637–639, 695–699, 765–769, 829–832, 104–107, 211–214, 241–244 and 409–413, 162 figs. Their application to shipyard, boiler, and tank work; locomotive and car building; girder and structural work; steel-works operation; hydraulic plate stretching, plate-bending rolls; flanging operations; trimming, girder milling, and plate-edge planing.

Railway-Wheel Production. Machine Tools for Railway Wheel Production. Machy. (Lond.), vol. 23, no. 586, Dec. 20, 1923, pp. 377–380, 5 figs. Boring and turning mill of novel design tooled for production of wheel centers.

Safety Devices. Accident Prevention in the Machine-Tool Industry (Unfallverhütung in der Werkzeugmaschinen industrie), H. Pfennig. Maschinenbau, vol. 3, no. 2, Oct. 25, 1923, pp. B9–B10, 5 figs. Describes special protective device for a lathe, and safety devices for planing machines. See also article by G. Puschmann, entitled, Modern Safety Devices for Punching Machines, pp. B10–B12, 4 figs.; Safety Devices for Woodworking Machines, R. Heinel, pp. B12–B13; and Modern Safety Devices for Agricultural Machines, L. Hofer, pp. B13–B14, 3 figs.

Standardized Parts. The Constructive Development of Standardized Machine Parts (Der konstruktive Aufbau genormter Maschinenteile), H. Lasswitz. Maschinenbau, vol. 3, no. 4, Nov. 22, 1923, pp. B22–B24, 8 figs. Discusses factors which influence constructive development.

MACHINERY

Foundations. Machinery Foundations. Power Engr., vol. 19, no. 214, Jan. 1924, pp. 10–11. Notes on foundations for steam engines, turbo-alternators and heavier kinds of pumping plant.

MACHINING METHODS

Defects, Overcoming. Overcoming Defects in Machining Raw Materials, T. H. Turner. Can. Machy., vol. 30, no. 25, Dec. 20, 1923, pp. 20–23. In considering the various types of defects, such as one encounters during machining of ferrous materials, uses to which finished product will be put must be borne in mind.

MARINE BOILERS

Prudhon-Capus. A Marine Boiler with Accelerated Circulation. Mar. Engr. & Nav. Architect, vol. 47, no. 556, Jan. 1924, pp. 33–34, 1 fig. Prudhon-Capus boiler to be adopted on new French liners.

Scotch. Scotch Marine Boilers. Power Plant Eng., vol. 28, no. 1, Jan. 1, 1924, pp. 28–30, 5 figs. General considerations of types and details of construction.

MATERIALS

Testing. Experimental Arrangements for Determination of Oscillating Strength of Materials (Versuchsanordnungen zur Bestimmung der Schwingungsfestigkeit von Materialien), O. Föppl. Maschinenbau, vol. 2, no. 25–26, Sept. 29, 1923, pp. G278–G280, 8 figs. Discusses different testing methods for duration tests, and compares advantages and disadvantages.

MATERIALS HANDLING

Pneumatic Conveying. The Pneumatic Conveying of Materials, M. W. Potts. Indus. Management (N. Y.), vol. 77, no. 1, Jan. 1924, pp. 9–15, 10 figs. Present state of development; principles involved; special problems encountered.

METAL WORKING

Faults, Overcoming. Correcting Faults in Metal-Working, F. Horner. English Mechanics, vol. 118, no. 3065, Dec. 21, 1923, pp. 310–311, 3 figs. Discusses common faults arising in engineering machine work and their remedies.

METALS

Cold Working. Alteration in Metal Structure by Cold Working (Ueber Strukturänderungen in Metallen durch Kaltbearbeitugn), M. Polanyi. Zeit. für Physik, vol. 17, no. 1, July 30, 1923, pp. 42–53. A new consideration is introduced, namely that, with cubical lattices, different possible gliding directions can compete with one another; explains structures of metal foils.

Diffusion of Hydrogen Through. The Diffusion of Hydrogen Through Metals, H. G. Deming and C. Hendricks. Am. Chem. Soc.—Jl., vol. 45, no. 12, Dec. 1923, pp. 2857–2864, 2 figs. Describes apparatus for studying rate of diffusion of gases through definitely measureable areas of sheet metal at definite, uniform temperatures.

Heat Treatment. The Heat Treatment of Metals, E. Pull. Machy. Market, nos. 1208 and 1209, Dec. 28, 1923 and Jan. 4, 1924, pp. 27–28 and 25–26, 3 figs. Definitions of words and phrases in general use in connection with annealing, hardening and tempering.

Properties at Elevated Temperatures. Mechanical Properties of Metals at Elevated Temperatures, D. H. Ingall. Metal Industry (Lond.), vol. 23, no. 24, Dec. 14, 1923, pp. 531–532. Users' and manufacturers' requirements; critical temperature; significance of viscous condition. Abstract of paper read before Birmingham Met. Soc.

Twin Crystallite Formation in. Twin Crystallite Formation in Certain Metals and Alloys (Ueber Zwillingsbildung in einigen Metallen und Legierungen), A. Schrader and E. Wiess. Zeit. für Metallkunde, vol. 15, no. 10, Oct. 1923, pp. 284–285, 3 figs. Twin crystallite formations in copper, brass, and bronze as proof of a previous strain with subsequent annealing.

MOTOR-TRUCK TRANSPORTATION

Economic Position. The Economic Position of Motor Transport. Sci. Am., vol. 130, no. 1, Jan. 1924, pp. 10–12, 6 figs. Discussion of motor-vehicle economy and mobility as realized in truck and bus.

Interurban Movements, Allocation of Truck in. Motor Transportation, L. W. McIntyre. Ry. Club of Pittsburgh—Proc., vol. 22, no. 8, Sept. 27, 1923, pp. 173–188 and (discussion) 188–200. Indicates necessity for study of motor transportation as a possible means of further improving present transportation facilities. Comparison of rail and truck rates; comparison of tonnage and distance hauled; discussion of whether "short haul" is unprofitable to railways; terminal practice and costs; regulation.

MOTOR TRUCKS

American-La France. American-La France 2½-Tonner Has Air-Cooled Disk Brake. Motor Transport (N. Y.), vol. 29, no. 10, Dec. 15, 1923, pp. 339–340, 5 figs. Describes new truck chassis of American-La France Fire Engine Co., Elmira, N. Y., and Bloomfield, N. J., having disk-type air impeller, cooled transmission brake and double-reduction rear axle designed also for use of worm drive.

Body Design. The Factor of Safety in Body Design, H. G. Bersie. Motor Transport (N. Y.), vol. 29, no. 10, Dec. 15, 1923, pp. 336–338, 5 figs. Strengths of various body materials and their relation to impact stresses and shocks; standard dimensions are recommended.

British Show. Eight New Speed Trucks Are Shown at British Exhibit, M. W. Bourdon. Automotive Industries, vol. 49, no. 25, Dec. 20, 1923, pp. 1240–1242, 10 figs. Designs are results of War Department offer to pay subsidy for vehicles of this type; flexible six-wheelers also prominent in commercial car show.

The Commercial Motor Transport Exhibition. Automobile Engr., vol. 13, no. 184, Dec. 1923, pp. 401–408, 28 figs. Outstanding features.

Electric. General Design and Urban Performance of Electric Trucks, J. G. Carroll. Soc. Automotive Engrs.—Jl., vol. 14, no. 1, Jan. 1924, pp. 23–29 and (discussion) 29–30 and 35, 12 figs. Considerations that influence design and location of motors and various methods by which their control is effected; details of construction and factors that determine selection of best type of drive; examination of requirements of delivery systems operating over city routes shows that electric truck is capable of meeting practically all demands of mileage, topographical conditions and speed; points out its advantages.

O

OIL ENGINES

Cylinder Heads. Designing Oil Engine Cylinder Heads, R. Hildebrand. Oil Engine Power, vol. 1, no. 12, Dec. 1923, pp. 603–607, 8 figs. Discusses cause of cracked cylinder head; how crack can be detected; when cylinder head must be replaced by new one; what causes blowing of gasket between head and cylinder.

Heavy-Oil. Some Considerations Affecting the Choice of a Heavy-Oil Engine, G. Porter. Diesel Engine Users Assn. (Lond.), no. 37, 30 pp. (includes discussion). Paper read at meeting on Nov. 16, 1923. Principal types available; fundamental principles; fuel oils; fuel consumption; conditions affecting combustion; particulars of design; cooling water; lubrication; costs.

Marine. A New Type of Neptune Marine Oil Engine. Mar. Engr. & Nav. Architect, vol. 47, no. 556, Jan. 1924, pp. 5–8, 5 figs. Details of "B" type; special cylinder design; scavenge and bilge pumps lever-driven off crossheads; fuel valve lift control.

Motor Ships and Marine Oil Engines in 1923. Engineer, vol. 137, no. 3549, Jan. 4, 1924, pp. 7–10, 5 figs. partly on supp. plate. Statistics of production and brief descriptions of most important types of oil engines.

Reversing Systems. Reversing Systems of Large Marine Oil Engines, V. Holmes. Inst. Mar. Engrs.—Trans., Dec. 1923, pp. 432–456 and (discussion) 456–467, 19 figs. Notes on types of four-stroke and two-stroke reversing systems.

Solid-Injection. Observations on the Solid-Injection Engine, P. H. Schweitzer. Power, vol. 59, no. 3, Jan. 15, 1924, pp. 90–91. Writer believes a flatter combustion line would be desirable, provided it would not lead to after-burning; better control of fuel injection as to spray action and accurate delivery in quantity and timing might lead to this end.

Torsiograms and Vibrograms of. Torsiograms and Vibrograms of Oil Engines. Motorship, vol. 9, no. 1, Jan. 1924, pp. 28–31, 45 figs. Simple instruments facilitate exploration of machinery for critical periodic stresses.

Manufactured by Advertisers

CLASSIFIED LIST OF MECHANICAL EQUIPMENT

Alphabetical List on page 156

Punches and Dies
* Royersford Fdry. & Mach. Co.

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(See Instruments, Recording)

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(See Dies, Thread Cutting)

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* Crane Co.

*Catalogue data of firms marked * appear in the A.S.M.E. Condensed Catalogues of Mechanical Equipment, 1923-24 Volume*

OIL FUEL

Efficient Use. Efficient Use of Liquid Fuel, H. A. Anderson. Foundry, vol. 52, no. 1, Jan. 1, 1924, pp. 29–30. Type of burners and amounts of air and oil pressure influence economical application of fuel oil; use of insulating brick and grade of fuel contributing factors.

OXY-ACETYLENE WELDING

Locomotive Repair Shops. Welding in Locomotive Repair Shops, F. E. Rogers. Welding Engr., vol. 8, no. 12, Dec. 1923, pp. 19–24, 19 figs. Particulars regarding the various oxy-acetylene welding operations employed in locomotive repair shops. Paper presented at Chattanooga Regional Mtg. of Southern Local Section of A.S.M.E.

P

PACKINGS

Leather. Types of Leather Packings—Their Care and Use, R. C. Moore. Belting, vol. 23, no. 6, Dec. 1923, pp. 44, 46 and 48, 12 figs. Describes most common forms; four dimensions indicate complete size; correct and incorrect installations.

PIPE, STEEL

Bending. Pipe Bending by Machinery, C. R. H. Bonn. Machy. (Lond.), vol. 23, nos. 584, 585 and 587, Dec. 6, 13 and 27, 1923, pp. 313–315, 333–334 and 418–421, 43 figs. Points out advantages and disadvantages of cold bending by machines, and discusses conditions which must be fulfilled by ideal pipe-bending machine.

PRESSES

Safety Appliances. Modern Safety Devices for Plate and Metalworking Machines (Neuzeitliche Unfallschutzvorrichtungen an Blech- und Metallbearbeitungsmaschinen), A. Herb. Maschinenbau, vol. 3, no. 2, Oct. 25, 1923, pp. G7–G10, 5 figs. Points out need of protective devices for presses, shears, etc.; and describes design and operation of some of these devices.

PRESSWORK

Door-Knob Manufacture. Manufacture of Pressed Metal Door Knobs, Emil Panek. Forging—Stamping—Heat Treating, vol. 9, no. 12, Dec. 1923, pp. 513–514, 9 figs. Various operations entering into manufacture; novel method used for assembling stamped parts.

PRODUCER GAS

Waste Wood as Source. Gasification Plants for Waste Products. Eng. Progress, vol. 4, no. 11, Nov. 1923, pp. 229–231, 3 figs. Describes wood gasification plants constructed by Motorenfabrik Deutz with idea of producing valuable tar oil besides generating power.

PSYCHOLOGICAL TESTS

Adaptability Tests. Adaptability Tests for Apprentices of the Metal Industry in the Psychotechnical Institute of the Dresden Technical College (Eignungsprüfungen an Lehrlingen der Metallindustrie im Psychotechnischen Institut and der T. H. zu Dresden), W. Blumenfeld. Maschinenbau, vol. 2, no. 22, Aug. 8, 1923, pp. B249–B253, 15 figs. Discusses devices and tests introduced for determination of adaptability of apprentices, and results of tests. See also following articles in same issue: Psychotechnical Adaptability Tests of Firm of A. Borsig, Tegel-Berlin, H. Hildebrandt, pp. B254–B256, 3 figs.; The Execution of Adaptability Tests, H. Rupp, pp. B256–B259; Psychotechnology in the Service of Factory Rationalization, H. Moede, pp. B259–B261; Applied Psychology and Its importance for Training of Engineers, pp. B261–B262.

Testing Device. A Device for Testing of Reaction, Attentiveness and Concentration (Eine Anordnung zur Prüfung von Reaktion, Verteilung der Aufmerksamkeit und Konzentration). Maschinenbau vol. 2, no. 22, Aug. 8, 1923, pp. B262–B264, 3 figs. Describes design and use of arrangement for testing adaptability of workers in engineering branches, such as crane drivers, switchboard operators in large electricity works, and for drivers of automobiles, street and railway cars, etc.

PULLEYS

Standards. Practical Application of Standards for Pulleys (Einführung der Riemenscheibenormen in die Praxis), W. Patzke. Maschinenbau, vol. 3, no. 4, Nov. 22, 1923, pp. B28–B31, 7 figs. Purposes of pulley standardization; introduction of standards; examples from practice at Wülfel Steel Works; influence of workshop tolerances on accuracy of speeds; faults of described system are said to be few in comparison with advantages.

PULVERIZED COAL

Boiler Firing. Application of Pulverized Coal to Boilers. Power Plant Eng., vol. 28, no. 1, Jan. 1, 1924, pp. 71–72, 2 figs. Preparation of fuel; storage of dry pulverized coal; importance of furnace design; ash removal facilitated by water screens; safety rules.

Chemical Works. Fuel Economy in Chemical Works, H. W. Hollands and C. Elliott. Chem. Trade Jl. & Chem. Engr., vol. 73, no. 1910, Dec. 28, 1923, pp. 761–763, 6 figs. Deals with expenditure, coal, and efficient combustion of coal, and examines possibilities of employing pulverized fuel firing, in light of experience that is now available.

Developments. Developments in the Use of Pulverized Coal, Chas. Longenecker. Power Plant Eng., vol. 28, no. 2, Jan. 15, 1924, pp. 127–130, 2 figs. Many installations have shown that pulverized coal can be burned with high degree of efficiency.

Locomotive Firing. Pulverized-Coal Firing for Locomotives (Zur Frage der Brennstaubfeuerung für Lokomotiven), H. de Grahl. Glasers Annalen, vol. 93, no. 11, Dec. 1, 1923, pp. 119–126, 22 figs. Advantages and disadvantages of pulverized-coal firing; suggestions for improvements in pulverizing fuel and durability of construction material.

Power Plants. Tests of a Powdered-Coal Plant, H. Kreisinger, J. Blizard, C. E. Augustine and B. J. Cross. U. S. Bur. Mines, Technical Paper 316, 1923, 22 pp., 10 figs. Report of investigations at power plant of St. Joseph Lead Co., Rivermines, Mo.; tests comprised 2 boiler tests, 6 dryer tests, and 8 mill tests.

Pulverizers. A British Unit Pulverizer for Coal and Other Materials. Power Engr., vol. 19, no. 214, Jan. 1924, p. 16, 2 figs. Features of design of Vickers-Griffin self-contained coal pulverizer, which enables small users of coal to adopt powdered-fuel firing economically.

Utilization, Germany. The Status of Pulverized-Coal Firing in Germany (Stand der Kohlenstaubfeuerung in Deutschland), G. Bulle. Wärme, vol. 46, no. 19, May 11, 1923, pp. 199–202, 7 figs. Field of application; technical features of pulverized-coal furnaces, practical results and conclusions.

PUMPING PLANTS

Diesel-Driven. A Novel Diesel Pumping Plant, F. J. Dixon. Power Engr. vol. 19, no. 214, Jan. 1924, pp. 23–24, 1 fig. Diesel-driven combination of borehole- and force-pump, without reservoir, erected at Somerford by So. Staffordshire Waterworks Co.

Mines. Features That Should be Embodied in the Design of Plunger and Centrifugal Pumps. Coal Age, vol. 25, no. 1, Jan. 3, 1924, pp. 11–14, 3 figs. Mining Congress committee suggest standards which should govern construction of pumps in coal mines, not for gathering water but for its delivery to surface.

Steam vs. Diesel-Driven. Comparative Running Costs of Steam and Diesel Driven Pumping Plants, K. B. Woodd Smith. Diesel Engine Users Assn.—paper read at meeting Oct. 5, 1923, 17 pp. (including discussion), 1 fig. Comparison shows economies to be effected by substitution of Diesel for Steam-driven pumps in water works where pumping is continuous throughout 24 hr.

PUMPS

Slippage Determination. A Simple Method of Determining Pump Slippage, J. E. Pierce. Eng. & Contracting (Water Works), vol. 60, no. 6, Dec. 12, 1923, pp. 1226–1227, 2 figs. Describes method used in determining slippage of one of the main pumps of Roanoke Water Works Co., Roanoke, Va.; instruments used were Pitot tube, manometer and counter of engines.

Sugar Factories. Sugar Factory Pumps P. H. Parr. Int. Sugar Jl., vol. 25, no. 298, Oct. 1923, pp. 527–530. Discussion of different types of pumps suitable for sugar factories; tables giving average net capacities for the various standard sizes of pumps.

PUMPS, CENTRIFUGAL

Installation. Installation of Centrifugal Pumps, J. Rosbloom. Ariz. Min. Jl., vol. 7, no. 14, Dec. 15, 1923, pp. 7–8 and 46, 8 figs. Discusses correct and incorrect methods of attaching suction piping.

Turbine-Driven. A Steam Turbine Waterworks Set. Power Engr., vol. 19, no. 214, Jan. 1924, pp. 17–19, 2 figs. Describes plant erected to meet special circumstances at Oakfield Road pumping station, Clifton.

PYROMETERS

Optical, Smoked Glasses in. The Use of Smoked Glasses in Optical Pyrometrical Measurements (Ueber den Gebrauch von Rauchgläsern bei optisch-pyrometrischen Messungen), F. Hoffmann. Zeit. für Physik, vol. 17, no. 1, July 30, 1923, pp. 1–22, 6 figs. Works out corrections in case of two Jena smoked glasses Nos. F3815 and F7839 in combination with Jena red filter F4512 when used in Holborn-Kurlbaum pyrometer.

R

RAILLESS TRACTION

France. Trackless Trolley System in France (La ligne d'omnibus électriques à trolet de Modane à Lanslebourg), A. Chardin. Revue Générale de l'Electricité, vol. 14, no. 23, Dec. 8, 1923, pp. 917–923, 7 figs. Traction system installed near Italian frontier in France; line is 15 mi. long with 1100-ft. elevation difference between start and finish; two 75-kw. substations transform and rectify 10,000-volt, 3-phase current into 550-volt d. c.; present rolling stock comprises three passenger cars and three 3-ton trucks, each car having two 16-kw. motors; average speed is 13 mi. per hr.

RAILS

Bonds, Welding of. Welded Rail Bonds, H. H. Febrey. Am. Welding Soc.—Jl., vol. 2, no. 12, Dec. 1923, pp. 18–24, 4 figs. Discusses flame weld bonds and arc weld bonds.

Low-Carbon. Low Carbon Rails Show Less Transverse Fissues, C. W. Gennet, Jr. Ry. Age, vol. 76, no. 2, Jan. 12, 1924, p. 186, 1 fig. Results of tests show that tendency for fissures to develop increases with carbon content of steel.

Transverse Fissures. Study of Transverse Fissures Broadened. Ry. Age, vol. 75, no. 25, Dec. 22, 1923, p. 1169. Bur. of Standards and Interstate Commerce Commission join roads and mills in investigations.

RAILWAY CONSTRUCTION

Ontario. Recent Developments on the Temiskaming and Northern Ontario Railway, S. B. Clement. Eng. Jl., vol. 7, no. 1, Jan. 1924, pp. 12–20, 12 figs. Development of Northern Ontario and its natural resources with extension of railway. See also Contract Rec. & Eng. Rev., vol. 37, no. 49, Dec. 5, 1923, pp. 1145–1148, 2 figs.

RAILWAY ELECTRIFICATION

Mexico. The Electrification of the Mexican Railway. Elec. Rev., vol. 93, no. 2404, Dec. 21, 1923, pp. 926–929, 4 figs. Deals with first section, from Esperanza to Orizaba.

RAILWAY MOTOR CARS

Benzol. Benzol Rail Cars (Benzolmechanische Eisenbahn-Triebwagen), H. Johannsen. Verkehrstechnik, vol. 40, no. 46–47, Nov. 23, 1923, pp. 409–411, 2 figs. Gives results of trial runs of railway motor cars built by Deutsche Werke A.-G., described in previous issue of same journal.

Development. Development of Railroad Motor Car. Eng. & Contracting (Railways), vol. 60, no. 6, Dec. 19, 1923, pp. 1304–1306. Present practice and requirements for gasoline and gasoline-electric driven cars on rails. Appendix to report of special committee of U. S. Chamber of Commerce.

RAILWAY OPERATION

Running of Trains, Determination of. Graphical Determination of Running of Trains, C. Fiala. Int. Ry. Congress Assn.—Bul., vol. 5, no. 12, Dec. 1923, pp. 1081–1086, 5 figs. Calculations of moving of a train. From journal of Soc. of Czecho-Slovakian Engrs. & Architects, Technicky Obzor, 1922.

Statistics, 1923. Railway Statistics for Nineteen Twenty-three, J. H. Parmelee. Ry. Age, vol. 76, no. 1, Jan. 5, 1924, pp. 46–49, 3 figs. Summary of achievement; new equipment; record freight traffic; operating efficiency; financial results; operating revenues; employees and their wages.

Train Control. Automatic Train Control Installation Completed. Ry. Rev., vol. 73, no. 25, Dec. 22, 1923, pp. 899–904, 8 figs. Chicago Rock Island & Pac. is first railroad to complete installation; outline of method of operation under system as installed.

Rock Island Places Train Control in Service. Ry. Age, vol. 75, no. 25, Dec. 22, 1923, pp. 1145–1149, 5 figs. Installation is first to be inspected by Interstate Commerce Commission under order; system of Regan Safety Devices Co., as used on this installation, is intermittent ramp contact type, with speed control.

RAILWAY REPAIR SHOPS

Car Repairing. Car Repair Contest, Delaware & Hudson Co. Ry. Rev., vol. 73, no. 25, Dec. 22, 1923, pp. 891–894, 3 figs. Five teams of car repairers compete on time basis in rebuilding composite hopper cars.

Locomotive. Classification of Locomotive Repair Shops, Geo. Armstrong. Ry. Mech. Engr., vol. 98, no. 1, Jan. 1924, pp. 41–46, 3 figs. Analysis of shop operations with object of reducing expenses and facilitating repairs.

Erie Completes Modern Addition to Hornell Shop. Ry. Age, vol. 76, no. 2, Jan. 12, 1924, pp. 181–185, 10 figs. Gap crane of 250 tons capacity comprises interesting feature of development.

RAILWAY SHOPS

Waste-Renovating Plant. Waste Renovating Plant at Beech Grove, Ind. Ry. Rev., vol. 73, no. 26, Dec. 29, 1923, pp. 931–935, 10 figs. Description of plant for reclaiming journal-box packing and process employed under a contract on output basis with Cleveland Cincinnati Chicago & St. Louis Ry.

RAILWAY SIGNALING

Construction, 1923. Signal Construction Shows Marked Increase, K. E. Kellenberger. Ry. Age, vol. 76, no. 1, Jan. 5, 1924, pp. 59–68. Remote-control switch installations grow in favor work proposed for 1924; statistics on automatic block signals and interlocking plants installed in 1923.

Signals, Types of. Railway Signaling, C. W. Parker. Can. Ry. Club—Proc., vol. 22, no. 8, Nov. 1923, pp. 21–26 and (discussion) 26–30. Deals with signals for path or track on which train has to travel, consisting generally as follows: "Stop," "Caution" or "Proceed;" different types.

RAILWAY TRACK

Rail-Conveying Machine. Platelaying with the Anderson Rail Conveyor. Ry. Gaz., vol. 39, no. 23, Dec. 7, 1923, pp. 719–721, 5 figs. Account of track-laying work carried out on Bengal-Nagpur Ry. in India with aid of a simple machine invented by A. T. D. Anderson, Assistant Engr., Bengal-Nagpur Ry., and description of machine.

RAILWAYS

Economics. Some Fundamentals in Transportation Economics, N. D. Ballantine. St. Louis Ry. Club—Proc., vol. 28, no. 8, Dec. 14, 1923, pp. 160–168.

Water Supply. Railroad Water Supply, E. F. Mason. Central Ry. Club—Proc., vol. 31, no. 5, Nov. 1923, pp. 1431–1436 and (discussion) 1436–1453. Sources of supply, and treatment of waters for use in locomotives; water storage; upkeep and maintenance of pumps; etc.

REFRACTORIES

Electric Furnaces. Electric Furnace Refractories, R. C. Gosrow. Chem. & Met. Eng., vol. 29, no. 27, Dec. 31, 1923, pp. 1181–1185. Practical suggestions for construction of lining walls, hearths and roofs that will enable electric-furnace operator to obtain maximum refractory service.

Manufactured by Advertisers CLASSIFIED LIST OF MECHANICAL EQUIPMENT

Alphabetical List on page 156

* Davis, G. M. Regulator Co.
* Foster Engineering Co.
* Fulton Co.
* Kieley & Mueller (Inc.)
Lunkenheimer Co.
* Pittsburgh Valve, Fdry. & Const. Co.
* Sarco Co. (Inc.)

Steel, Alloy
Cann & Saul Steel Co.
Union Drawn Steel Co.

Steel, Bar
Cann & Saul Steel Co.

Steel, Bright Finished
Union Drawn Steel Co.

Steel, Cold Drawn
Union Drawn Steel Co.

Steel, Cold Rolled
Cumberland Steel Co.
Union Drawn Steel Co.

Steel, Nickel
Union Drawn Steel Co.

Steel, Open-Hearth
* Falk Corporation
Union Drawn Steel Co.

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* Brownell Co.
* Burhorn, Edwin Co.
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* Keeler, E. Co.
Morrison Boiler Co.
Steere Engineering Co.
* Titusville Iron Works Co.
* Union Iron Works
* Vogt, Henry Machine Co.
* Walsh & Weidner Boiler Co.

Steel, Rock Drill
* Ingersoll-Rand Co.

Steel, Screw, Cold Drawn
Union Drawn Steel Co.

Steel, Strip (Cold Rolled)
Driver-Harris Co.

Steel, Tool
Cann & Saul Steel Co.

Steel, Vanadium
Union Drawn Steel Co.

Steps, Ladder & Stair (Non-Slipping)
* Irving Iron Works Co.

Stills
* Vogt, Henry Machine Co.

Stocks and Dies
* Landis Machine Co. (Inc.)

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* Babcock & Wilcox Co.
* Combustion Engineering Corp'n
* Westinghouse Electric & Mfg. Co.

Stokers, Overfeed
* Detroit Stoker Co.
* Riley, Sanford Stoker Co.
* Westinghouse Electric & Mfg. Co.

Stokers, Underfeed
* American Engineering Co.
* Combustion Engineering Corp'n
* Detroit Stoker Co.
* Riley, Sanford Stoker Co.
* Sturtevant, B. F. Co.
* Westinghouse Electric & Mfg. Co.

Stools and Chairs, Metal
ManufacturingEquip.&Engrg.Co.

Strainers, Oil
* Bowser, S. F. & Co. (Inc.)
* Mason Regulator Co.

Strainers, Steam
* Foster Engineering Co.
* Kieley & Mueller (Inc.)
* Mason Regulator Co.

Strainers, Water
Elliott Co.
* Foster Engineering Co.
* Kieley & Mueller (Inc.)
* Mason Regulator Co.
* Schutte & Koerting Co.

Strainers, Water (Traveling)
Link-Belt Co.

Structural Steel Work
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* Walsh & Weidner Boiler Co.

Sugar Machinery
Farrel Foundry & Machine Co.
* Walsh & Weidner Boiler Co.

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* Power Specialty Co.
* Superheater Co.

Superheaters, Steam (Locomotive)
* Power Specialty Co.
* Superheater Co.

Superheaters, Steam (Marine)
* Power Specialty Co.
* Superheater Co.

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* General Electric Co.
* Westinghouse Electric & Mfg. Co.

Switches, Electric
* General Electric Co.
* Westinghouse Electric & Mfg. Co.

Synchronous Converters
(See Converters, Synchronous)

Tables, Drawing
Dietzgen, Eugene Co.
Economy Drawing Table & Mfg. Co.
Electro Sun Co. (Inc.)
Keuffel & Esser Co.
New York Blue Print Paper Co.
ParVell Laboratories
U. S. Blue Co.
Weber, F. Co. (Inc.)

Tachometers
* American Schaeffer & Budenberg Corp'n
* Bristol Co.
Veeder Mfg. Co.

Tachoscopes
* American Schaeffer & Budenberg Corp'n

Tanks, Acid
* Graver Corp'n
* Walsh & Weidner Boiler Co.

Tanks, Copper
* Geuder, Paeschke & Frey Co.

Tanks, Ice
* Frick Co. (Inc.)
* Graver Corp'n

Tanks, Oil
* Geuder, Paeschke & Frey Co.
* Graver Corp'n
* Hendrick Mfg. Co.
Morrison Boiler Co.
Nugent, Wm. W. & Co. (Inc.)
* Scaife, Wm. B. & Sons Co.
* Titusville Iron Works Co.
* Walsh & Weidner Boiler Co.

Tanks, Pressure
* Brownell Co.
* Geuder, Paeschke & Frey Co.
* Graver Corp'n
* Hendrick Mfg. Co
Morrison Boiler Co.
* Titusville Iron Works Co.
* Vogt, Henry Machine Co.
* Walsh & Weidner Boiler Co.

Tanks, Steel
* Bigelow Co.
* Brownell Co.
* Casey-Hedges Co.
* Cole, R. D. Mfg. Co.
* Geuder, Paeschke & Frey Co.
* Graver Corp'n
* Hendrick Mfg. Co.
Morrison Boiler Co.
* Scaife, Wm. B. & Sons Co.
* Titusville Iron Works Co.
* Union Iron Works
* Vogt, Henry Machine Co.
* Walsh & Weidner Boiler Co.

Tanks, Storage
* Brownell Co.
* Cole, R. D. Mfg. Co.
* Combustion Engineering Corp'n
* Graver Corp'n
* H. S. B. W.-Cochrane Corp'n
* Hendrick Mfg. Co.
Herbert Boiler Co.
Morrison Boiler Co.
Nugent, Wm. W. & Co. (Inc.)
* Scaife, Wm. B. & Sons Co.
* Titusville Iron Works Co.
* Vogt, Henry Machine Co.
* Walsh & Weidner Boiler Co.

Tanks, Tower
* Graver Corp'n
* Walsh & Weidner Boiler Co.

Tanks, Welded
* Cole, R. D. Mfg. Co.
* Graver Corp'n
Morrison Boiler Co.
* Scaife, Wm. B. & Sons Co.

Tap Extensions
Allen Mfg. Co.

Tapping Attachments
* Whitney Mfg. Co.

Temperature Regulators
(See Regulators, Temperature)

Testing Laboratories, Cement
* Smidth, F. L. & Co.

Textile Machinery
* Franklin Machine Co.

Thermometers
* American Schaeffer & Budenberg Corp'n
* Ashton Valve Co.
* Bristol Co.
* Sarco Co. (Inc.)
* Tagliabue, C. J. Mfg. Co.
* Taylor Instrument Cos.

Thermometers, Chemica
* Tagliabue, C. J. Mfg. Co.

Thermometers, Distance
* Taylor Instrument Cos.

Thermometers, High Range (Recording)
* Bailey Meter Co.
* Tagliabue, C. J. Mfg. Co.
* Taylor Instrument Cos.

Thermometers, Industrial
* Tagliabue, C. J. Mfg. Co.

Thermostats
* Bristol Co.
* Fulton Co.
* General Electric Co.

Thread Cutting Tools
* Crane Co.
* Jones & Lamson Machine Co.
* Landis Machine Co. (Inc.)

Threading Machines, Pipe
* Landis Machine Co. (Inc.)

Tie Tamping Outfits
* Ingersoll-Rand Co.

Time Recorders
* Bristol Co.

Tinsmiths' Tools and Machines
* Niagara Machine & Tool Works

Tipples, Steel
Link-Belt Co.

Tobacco Machinery
* American Machine & Foundry Co.

Tongs, Crane
* Kenworthy, Chas. F. (Inc.)

Tools, Brass-Working Machine
* Warner & Swasey Co.

Tools, Machinists' Small
* Atlas Ball Co.

Tools, Pneumatic
* Ingersoll-Rand Co.

Tools, Special
DuPont Engineering Co.

Tracks, Industrial Railway
Easton Car & Construction Co.
Northern Engineering Works

Tractors
* Allis-Chalmers Mfg. Co.

Tractors, Industrial (Storage Battery)
* Yale & Towne Mfg. Co.

Tractors, Turntable
* Whiting Corp'n

Trailers, Industrial
* Yale & Towne Mfg. Co.

Tramrail Systems, Overhead
* Brown Hoisting Machinery Co.
Link-Belt Co.
Northern Engineering Wks.
Reading Chain & Block Corp'n
* Whiting Corp'n

Tramways, Bridge
Link-Belt Co.

Tramways, Wire Rope
Clyde Iron Works Sales Co.
Lidgerwood Mfg. Co.
* Roebling's, John A. Sons Co.

Transfer Tables
* Whiting Corp'n

Transformers, Electric
* Allis-Chalmers Mfg. Co.
* General Electric Co.
* Westinghouse Electric & Mfg. Co.

Transmission Machinery
(See Power Transmission Machinery)

Transmissions, Automobile
* Foote Bros. Gear & Machine Co.

Transmissions, Variable Speed
* American Fluid Motors Co.

Traps, Radiator
* American Radiator Co.
* Sarco Co. (Inc.)

Traps, Return
* American Blower Co.
* Crane Co.
* Kieley & Mueller (Inc.)

Traps, Steam
* American Blower Co.
* American Schaeffer & Budenberg Corp'n
* Crane Co.
* Davis, G. M. Regulator Co.
Elliott Co.
* Jenkins Bros.
Johns-Manville (Inc.)
* Kieley & Mueller (Inc.)
* Reading Steel Casting Co. (Inc.)
(Pratt & Cady Division)
* Sarco Co. (Inc.)
* Schutte & Koerting Co.
Squires, C. E. Co.
* Vogt, Henry Machine Co.

Traps, Vacuum
* American Blower Co.
* American Schaeffer & Budenberg Corp'n
* Crane Co.
* Sarco Co. (Inc.)

Treads
* Irving Iron Works Co.

Treads, Stair (Rubber)
* United States Rubber Co.

Trolleys
* Brown Hoisting Machinery Co.
Reading Chain & Block Corp'n
* Whiting Corp'n

Trucks, Industrial (Storage Battery)
* Yale & Towne Mfg. Co.

Trucks, Trailer
* Yale & Towne Mfg. Co.

Tubes, Boiler, Seamless Steel
* Casey-Hedges Co.

Tubes, Condenser
* Scovill Mfg. Co.
* Wheeler Condenser & Engrg. Co.

Tubes, Pitot
Bacharach Industrial Instrument Co.

Tubing, Rubber
* Goodrich, B. F. Rubber Co.
* United States Rubber Co.

Tubing, Rubber (Hard)
* Goodrich, B. F. Rubber Co.

Tumbling Barrels
Farrel Foundry & Machine Co.
Northern Engineering Works
* Royersford Fdry. & Mach. Co.
* Whiting Corp'n

Turbines, Hydraulic
* Allis-Chalmers Mfg. Co.
* Cramp, Wm. & Sons Ship & Engine Bldg. Co.
Hoppes Water Wheel Co.
* Leffel, James & Co.
Newport News Shipbuilding & Dry Dock Co.
Smith, S. Morgan Co.
* Worthington Pump & Mchry. Corp'n

Turbines, Steam
* Allis-Chalmers Mfg. Co.
* Coppus Engineering Corp'n
* De Laval Steam Turbine Co.
* General Electric Co.
* Kerr Turbine Co.
Moore Steam Turbine Corp'n
Ridgway Dynamo & Engine Co.
* Sturtevant, B. F. Co.
* Terry Steam Turbine Co.
* Westinghouse Elec. & Mfg. Co.

Turbo-Blowers
* Coppus Engineering Corp'n
* General Electric Co.
* Ingersoll-Rand Co.
* Kerr Turbine Co.
Moore Steam Turbine Corp'n
* Sturtevant, B. F. Co.

Turbo-Compressors
* Ingersoll-Rand Co.

Turbo-Generators
* Allis-Chalmers Mfg. Co.
* De Laval Steam Turbine Co.
* General Electric Co.
* Kerr Turbine Co.
Moore Steam Turbine Corp'n
Ridgway Dynamo & Engine Co.
* Sturtevant, B. F. Co.
* Terry Steam Turbine Co.
* Westinghouse Electric & Mfg. Co.

Turbo-Pumps
* Coppus Engineering Corp'n
* Kerr Turbine Co.
Moore Steam Turbine Corp'n
* Terry Steam Turbine Co.
* Wheeler Condenser & Engineering Co.

Turntables
Easton Car & Construction Co.
Link-Belt Co.
Northern Engineering Works
* Whiting Corp'n

Turret Machines
(See Lathes, Turret)

Unions
* Crane Co.
* Edward Valve & Mfg. Co.
Lunkenheimer Co.
* Pittsburgh Valve, Fdry. & Const. Co.
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Unloaders, Air Compressor
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* Worthington Pump & Machinery Corp'n

Unloaders, Ballast
Lidgerwood Mfg. Co.

Unloaders, Car
* Gifford-Wood Co.
Link-Belt Co.

*Catalogue data of firms marked * appear in the A.S.M.E. Condensed Catalogues of Mechanical Equipment, 1923-24 Volume*

REFRIGERANTS

Ethyl Chloride. Thermal Properties of Ethyl Chloride. Cold Storage, vol. 26, no. 309, Dec. 20, 1923, pp. 456–458, 1 fig. Food Investigation Board on C. F Jenkin's experiments.

REFRIGERATING MACHINES

CO_2 Compressors. Ten-Ton Refrigerating CO_2 Compressor. Engineering, vol. 116, no. 3024, Dec. 14, 1923, p. 738, 1 fig. Machine is of twin-cylinder, single-acting vertical type, with capacity of 10 tons of refrigeration per 24 hr. and is driven by 20-b.hp. electric motor which runs at 400 to 500 r.p.m.

REFRIGERATING PLANTS

Condensers and Brine Coolers. Condensers and Brine Coolers, J. C. Goosmann. Ice & Refrigeration, vol. 65, nos. 1, 2, 3, 4 and 5, July, Aug., Sept., Oct. and Nov. 1923, pp. 13–15, 74–76, 133–134, 195–197 and 259–262, 9 figs. Their characteristics, temperature differences and ranges, coefficients of heat transfer, and surface requirements; steam condensers; double-pipe coolers and condensers; speeds of media; mean temperature difference; CO_2 condensers; pressure-heat-content diagram for CO_2; Mollier diagram; research on CO_2 properties; total condenser work in B.t.u.

REFRIGERATION

Ammonia Charts. Refrigeration and the Ammonia Chart, David L. Fiske. Ice & Refrigeration, vol. 65, nos. 4, 5 and 6, Oct., Nov. and Dec. 1923, pp. 204–206, 265–267 and 363–365, 11 figs. Describes capacities and efficiencies of refrigeration systems; cycles of operation with different condenser and evaporation pressures; coefficients of performances; wet and dry compression; constants of cycles; theoretical and practical considerations; clearance in compressors; calculation of compressors with and without clearance; excessive clearance; test data on effect of clearance.

RESEARCH

Industrial. The Function and Scope of Industrial Research, A. R. M. Fleming. Indus Management (Lond.), vol. 10, no. 13, Dec. 27, 1923, pp. 356–357. Abridgment of paper read at Regent Street Polytechnic (Lond.), under auspices of Industrial League and Council.

Nat. Research Council, Work of. Work of the National Research Council, Vernon Kellogg. Science, vol. 58, nos. 1505 and 1506, Nov. 2 and 9, 1923, pp. 337–341 and 362–366. Statement of activities for year July 1, 1922—June 30, 1923. See also Nat. Research Council, Reprint & Circular Series, No. 49, 1923, 16 pp.

ROLLING MILLS

Sheet Mills. Detroit's New Automobile Sheet Plant. Iron Age, vol. 113, no. 1, Jan. 3, 1924, pp. 50–53, 8 figs. Features of works of Michigan Steel Corp. include short hauls to and from rolls and quick drying of washed sheets.

S

SAND, MOLDING

Foundry Problems. Molding Sand Problem in the Foundry, Eugene W. Smith. Iron Age, vol. 113, no. 4, Jan. 24, 1924, pp. 299 and 340–341. Important bearing of varying physical characteristics; vibratory test as dependable method for determining them.

Preparation and Testing. The Preparation and Testing of Moulding and Core Sands, E. M. Currie. Foundry Trade Jl., vol. 28, no. 382, Dec. 13, 1923, pp. 498–500, 5 figs. Chemical aspect of sand; mechanical testing; mixing; tempering; sharp sand and binders; oil sand mixers.

SCREW THREADS

Standards. The New Screw Thread Standard, Ralph E. Flanders. Am. Mach., vol. 59, nos. 5, 9, 12, 14, 16 and 26, Aug. 2, 30, Sept. 20, Oct. 4, 18 and Dec. 27, 1923, pp. 167–169, 327–328, 441–442, 501–506, 589–590 and 939–942, 10 figs. History of National Screw Thread Commission and A.E.S.C. sectional committee; terminology and definitions from report; explanation of various terms used; considerations affecting clearances and methods of gaging. Fine- and coarse-thread series; elimination of unnecessary threads. Condensed tables of dimensions for different classes of fits; fine and coarse threads; numbered and fractional sizes. Principles employed in specifying tolerances. Provisions for special threads and fits in Screw Thread Report of A.E.S.C. tables and charts showing tolerances.

SCREWS

Wood, Cold Heading of. The Cold Heading of Wood Screws, A. K. Hamer. Forging—Stamping—Heat Treating, vol. 9, no. 12, Dec. 1923, pp. 511–512, 6 figs. Advantage and disadvantage of basic and Bessemer wires; carbon steel 0.90 to 1.00 per cent superior to alloy steel for header dies using special design fixture.

SEAPLANES

Landing Base. A Seaplane Base for Commercial Air Transport, E. D. Osborn. Aviation, vol. 16, no. 5, Feb. 4, 1924, pp. 123–124. Describes commercial seaplane base located in Florida from which F5L twin Liberty flying boats, converted to carry 10 passengers, were operated for period of over three years.

SHAFTS

Foundation Vibrations, Influence of. The Influence of Foundations on the Critical Behavior of High-Speed Shafts (Die Einwirkung des Fundaments auf das kritische Verhalten raschumlaufender Wellen), V. Biaess. Maschinenbau, vol. 2, no. 25–26, Sept. 29, 1923, pp. B281–B283, 3 figs. Numerical investigation. See also article by H. Gerb, entitled, The Transmission of Machine-Foundation Vibrations in the Earth, pp. B283–B284.

SHEET-METAL WORKING

Scientific Aspects. Science for the Sheet Metal Worker, Thos. Newton. Sheet Metal Worker, vol. 14, nos. 7, 9, 13, 17, 19, 21 and 24, Apr. 27, May 25, July 20, Sept. 14, Oct. 12, Nov. 9 and Dec. 21, 1923, pp. 251–252 and 276, 330–332, 493–494, 646–647 and 667, 719–720, 789 and 816, and 899–900 and 925, 3 figs. Deals with chemistry, physics and metallurgy. Matter; physical and chemical changes; chemical affinity; elements; compounds; chemical action; influence of heat and light; etching of copper and brass; hydrogen and its properties; water gas; oxygen; ozone; combustibles and supporters of combustion; atomic theory; chemical symbols and formulas; etc.

SMOKE ABATEMENT

Methods. Smoke Abatement, O. Monnett. U. S. Bur. Mines, Technical Paper 273, 1923, 31 pp., 18 figs. partly on supp. plates. Determination of atmospheric impurities; composition of pure air; nature of atmospheric pollution; effect of atmospheric pollution upon health, vegetation, and property; possibilities of smoke abatement; domestic smoke problem; industrial smoke; locomotive smoke; smoke ordnances.

SPEED INDICATORS

Stroboscopic. The Stroboscopic Speed Indicator. Practical Engr., vol. 67, no. 1874, Jan. 25, 1923, pp. 49–50, 3 figs. Describes Crompton-Roberton stroboscopic vibrator having two similar vibrating bars clamped to base, and electromagnet arranged so that it can set bars in state of vibration.

SPRINGS

Automobile. New Springs for Automobiles (Neue Federung für Kraftwagen), Ad. König. Motorwagen, vol. 26, nos. 29–30 and 32–33, Oct. 20–31 and Nov. 20–30, 1923, pp. 436–437 and 464–466, 6 figs. Points out shortcomings of automobile springs commonly used; and describes new system of springs and chassis developed by firm of Sorge & Sabeck.

STANDARDIZATION

Germany. An Example of Standardization in German Industry, G. Leifer and H. Goller. Mech. Eng., vol. 46, no. 1, Jan. 1924, pp. 54–55, 3 figs. Notes on manner in which standardization is practiced in the "Wernerwerk," a Siemens & Halske factory employing 18,000 men and producing electrical machinery, illustrating very close coöperation existing between German industry and the German Industrial Standards Committee (DIN).

Live Spindles of Machine Tools The Standardization of Threaded Machine-Tool Spindles (Die Normung der Spindelköpfe mit Gewinde). Maschinenbau, vol. 3, no. 4, Nov. 22, 1923, pp. B24–B25, 40 figs. Decision of Standard Committee of Assn. German Machine-Tool Builders.

STANDARDS

German N. D. I. Reports. Report of the German Industrial Standards Committee (Normenausschuss der Deutschen Industrie). Maschinenbau, vol. 2, no. 21, July 26, 1923, pp. N140–N150, 11 figs. Proposals for standards of tangential grooves, drive, flat, hollow and gib-headed keys, gib-headed flat and hollow keys, hexagonal bolts with point, etc.

Report of the German Industrial Standards Committee (Normenausschuss der Deutschen Industrie). Maschinenbau, vol. 2, no. 24, Sept. 15, 1923, pp. N167–N174, 10 figs. Proposals for standards of solid and split adjustable spring collars for setting screws with Whitworth and metric thread.

Report of the German Industrial Standards Committee (Normenausschuss der Deutschen Industrie). Maschinenbau, vol. 2, no. 25–26, Sept. 29, 1923, pp. N175–N182, 2 figs. Proposed standards for metal circular saws and slot cutters, low-carbon-steel pipes for pipe lines and for stationary, locomotive and marine boilers; low carbon-steel pipes and molds welded in water-gas and coke firing; Whitworth pipe threads for fittings.

Report of the German Industrial Standards Committee (Normenausschuss der Deutschen Industrie). Maschinenbau, vol. 3, no. 3, Nov. 8, 1923, pp. N9–N18, 20 figs. Proposals for standards of hexagonal steel and iron, flat drawn steel, hollow flat steel, and cutting steels. Proposed standards for overhead countershafts, hand chisel and cutting steels.

Report of the German Industrial Standards Committee (Normenausschuss der Deutschen Industrie). Maschinenbau, vol. 3, no. 4, Nov. 22, 1923, pp. N19–N24, 6 figs. Proposals for indicator cocks. Proposed standards for bushes, ball bearings, indicator screw plugs, open d. c. generators, transformers, gear transmissions for standardized electric motors, clamps and slip rings for electric machines, etc.

STEAM

High-Pressure. Investigations of the Properties of Steam at High Pressures (Die bisherigen Forschungen über die Eigenschaften des Wasserdampfes bei hohen Spannungen), H. Schmolke. Wärme, vol. 46, no. 23, June 8, 1923, pp. 243–246, 1 fig. Compares values of heat of evaporation and volume of saturation at high pressures found by Schüle and Eichelberg by means of extrapolation, and shows advantages of German research over English works in same field.

Maximum Steam Pressure, and Economical Power Supply. (Höchstdruck und Energiewirtschaft), H. Gleichmann. Zeit. des Vereines deutscher Ingenieure, vol. 67, no. 52, Dec. 29, 1923, pp. 1159–1162, 6 figs. Points out that greater efficiency and saving in coal are obtained by increase of pressure and superheat; effect on different manufacturing branches with special regard to delivery of excess current to public distribution systems.

STEAM ENGINES

Lubrication. Reciprocating Steam Engines. Lubrication, vol. 9, no. 11, Nov. 1923, pp. 122–128, 6 figs. Details in connection with internal and external lubrication.

Marine, Valve Gears for. Valve Gears for Marine Steam Engines (Ventilsteuerungen für Schiffs-Kolbendampfmaschinen), K. Trautner. Schiffbau, vol. 25, nos. 4, 5 and 6, Nov. 28, Dec. 12 and 26, 1923, pp. 75–79, 102–106 and 129–133, 13 figs. Describes development and types of marine steam engines with poppet valve gear; determination of valve conditions and force of spring; discusses several types, including Kug gear in wide use for engines of fishing vessels; time-acceleration curves. Bibliography.

Types and Selection. The Control of Power Production, Chas. L. Hubbard. Factory, vol. 31, no. 6, Dec. 1923, pp. 750–754 and 788, 10 figs. Steam-engine types and their selection.

Uniflow. Action of Unaflow Engine Governor Eccentrics, W. Turnwald. Power, vol., 59 no. 3, Jan. 15, 1924, pp. 94–96, 8 figs. Effect of excessive lead at light loads; types of governor eccentrics and influence on lead; variation of lead with change in cut-off.

STEAM PIPES

Insulation. The Influence of Steam Utilization on the Most Economical Strength of Insulation (Der Einfluss der Dampfverwertung auf die wirtschaftlichste Isolierstärke), J. S. Cammerer. Archiv für Wärmewirtschaft, vol. 4, no. 11, Nov. 1923, pp. 197–200, 1 fig. Discusses methods of measuring heat insulation of pipe lines.

STEAM POWER PLANTS

Economy. Economics of Plant Management and the Choice of Fuel, W. Polakov. Nat. Engr., vol. 27, no. 12, Dec. 1923, pp. 588–591, 6 figs. Factors affecting efficiency; data on what can be accomplished by modern methods in average plant.

Mercury Vapor-Steam System. Binary Fluid System Using Mercury Vapor Expected to Cut Power Costs, P. M. Heldt. Automotive Industries, vol. 50, no. 1, Jan. 3, 1924, pp. 20–21. Gen. Elec. Co. responsible for development of new method which bids fair to result in more economical utilization of fuel; efficiency obtained by recovering some of latent heat.

Process Steam. Process Steam as a Power Plant Product, Miles Sampson. Textile World, vol. 65, no. 1, Jan. 5, 1924, pp. 81–82 and 85, 3 figs. Points out that in mill finishing its own goods, process steam may become principal product of power plant; factors in problem of maintaining adequate steam supply at pressures demanded and economically balancing this load with power requirements.

STEAM TURBINES

Blades. Steam Turbine Blading, J. C. Read. Instn. Elec. Engrs.—Jl., vol. 61, no. 323, Oct. 1923, pp. 1109–1114, 5 figs. Review of present position. Deals with causes and effects of corrosion and erosion; form of blade passage in impulse and reaction machines, and energy losses occurring in blading; methods of tapering blades; details of stresses; types of blade fastenings, lacing and shrouding; methods used for obtaining large exhaust area; vibration and its causes; method of correcting for effect of centrifugal force; methods of manufacture by milling and drop forging.

Control, Hydraulic Relay for. Turbine Controlled by Temperature or Pressure. Power Plant Eng., vol. 28, no. 2, Jan. 15, 1924, pp. 162–163, 2 figs. Describes hydraulic relay device which will transmit impulses from thermostat or pressure diagram to distance and at same time magnify power of these impulses so that they will control turbine governor with positiveness.

Impulse and Reaction. Impulse and Reaction in Steam Turbines, F. P. Hodgkinson. Power, vol. 59, no. 5, Jan. 29, 1924, pp. 174–175, 6 figs. It is shown that main distinction between impulse and reaction turbines as termed in practice, lies in fact that in first type no expansion of steam occurs in moving blade passages, while in latter type it does take place.

Lubrication. Steam Turbine Lubrication. Lubrication, vol. 9, no. 11, Nov. 1923, pp. 129–132, 5 figs. Factors affecting selection of lubricants; characteristics pertinent to the oil.

Metropolitan-Vickers. The Metropolitan-Vickers Steam Turbine. Elec. Rev., vol. 93, no. 2404, Dec. 21, 1923, pp. 953–955, 3 figs. Describes 18,750-kw. turbine, as built for Dalmarnock power station, Glasgow.

Nozzles. Second Report of the Steam-Nozzles Research Committee. Instn. Mech. Engrs.—Proc., vol. 1, no. 3, 1923, pp. 311–348 and (discussion) 349–395, 23 figs. It is believed that results represent first attempt to carry out on full-size scale systematic investigation into efficiency of steam-turbine nozzles; discusses use of impulse method for obtaining thrust of steam at exit of nozzle; use of superheat on both sides of nozzle; variation in initial superheat; use of commercial nozzles and of Callendar's steam tables; calculation of heat drop.

Principles of Operation. The Control of Power Production, Chas. L. Hubbard. Factory, vol. 32, no. 1, Jan. 1924, pp. 27–29, 64, 66, 68 and 70, 23 figs. Principles of steam-turbine operation.

STEEL

Automobile. Automobile Sheet Steel Specifications, H. M. Williams. Am. Soc. Steel Treating—Trans., vol. 5, no. 1, Jan. 1924, pp. 82–88. Salient factors in connection with chemical and physical specifications and inspection of sheet steel for automotive and other similar industrial purposes; tentative specifications of Gen. Motors Co. on cold-rolled strip steel

Manufactured by Advertisers

CLASSIFIED LIST OF MECHANICAL EQUIPMENT

Alphabetical List on page 156

Vacuum Breakers
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Vacuum Dryers, Pans, Pumps, Traps, etc.
(See Pans, Pumps, Traps, etc., Vacuum)

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* Smith, H. B. Co.

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Link-Belt Co.

Wrapping Machinery
* American Machine & Foundry Co.

Wrenches
* Roebling's, John A. Sons Co.

and sheet steel, including physical and chemical tests applied to these materials.

Basic and Acid, Comparative Investigations. Comparative Investigations of Basic and Acid Steel with the Aid of Research Values (Vergleichende Untersuchungen von basischem und saurem Stahl mit Hilfe der Grosszahlforschung), F. Schmitz. Stahl u. Eisen, vol. 43, no. 50, Dec. 13, 1923, pp. 1536–1539. Compilation of strength and analytical values of 200 basic and 200 acid hearth-furnace steel specimens; recommendations for further research.

Calorizing. Use of Aluminum to Prevent Steel Corrosion, A. V. Farr. Chem. & Met. Eng., vol. 29, no. 27, Dec. 31, 1923, pp. 1188–1189. This process, called calorizing, consists in alloying surface of steel with aluminum.

Chrome. See CHROME STEEL.

High-Speed. See STEEL, HIGH-SPEED.

Identification at the Bin. How to Identify Nickel and Other Steels at the Bins, H. C. Knerr. Automotive Industries, vol. 49, no. 25, Dec. 20, 1923, pp. 1253–1254. Sparks from emery wheel give indications as to carbon content and certain alloys such as chromium and tungsten; simple chemical test for indicating presence of nickel is easily applied.

Tests. The Chemical, Metallographical and Physical Testing of Steel (in Bars) [Die chemische, metallographische und physikalische Prüfung von Stahl (in Stangenform)], H. Graefe. Maschinenbau, vol. 2, no. 24, Sept. 15, 1923, pp. G257–G260, 6 figs. Points out that tensile tests for testing of steel are often inadequate and additional chemical, metallographical and physical tests are necessary; how such tests should be conducted.

[See also IRON AND STEEL.]

STEEL, HEAT TREATMENT OF

Electric-Furnace. Electrical Energy Economical for Heat Treating, E. F. Collins. Am. Soc. Steel Treating—Trans., vol. 5, no. 1, Jan. 1924. pp. 67–81, 3 figs. Reviews relative cost data in operation of electric and fuel-fired furnaces, pointing out that electrical heating is economical and comparable to fuel heating; discusses heat generation, heat conservation, and methods of electric heat transmission and delivery to charge.

Permanent Magnets. Investigation of the Treatment of Steel for Permanent Magnets, R. L. Dowdell. Am. Soc. Steel Treating—Trans., vol. 5, no. 1, Jan. 1924, pp. 27–65, 17 figs. Deals with various treatments of tungsten, chromium, cobalt-chrome and miscellaneous magnet steels in order to give them greatest permanent; explains simple but accurate testing apparatus for bar magnets; compares new type of coercive force called open-circuit with usual coercive force; gives magnetic saturation curves, and natural and artificial aging curves for different treatments.

Salt Baths. Salt Baths and Containers for Hardening, Sam Tour. Am. Soc. Steel Treating—Trans., vol. 5, no. 1, Jan. 1924, pp. 7–19 and (discussion) 19–26, 7 figs. Discusses salt baths for heating of steel tools and parts and gives simple method of desulphurizing salt bath; decarburizing effects of chloride salt baths at 1600 deg. fahr., upon materials being treated; photomicrographs of steels heated in various types of salt baths; principles in regard to design of furnaces.

STEEL, HIGH-SPEED

Cast Tools. Casting High Speed Steel Tools, J. M. Quinn. Iron Trade Rev., vol. 75, no. 3, Jan. 17, 1924, pp. 226–230, 6 figs. Methods and theories by two firms manufacturing tools cast to approximate size and shape; how properties of tools can be controlled.

High-Speed Steel for Cast Tools, J. M. Quinn. Iron Age, vol. 112, no. 26, Dec. 27, 1923, pp. 1711–1712, 4 figs. Electric melting practice; proportioning and handling charge; molds and heat treatment.

STEEL MANUFACTURE

Chemical Dissociation. Importance of Dissociation of Chemical Compounds in Steel Making, J. Kent Smith. Chem. & Met. Eng., vol. 30, no. 2, Jan. 14, 1924, pp. 49–50. Observations on use of carbonless alloys for introducing alloying metal into steel show significance of chemical dissociation to metallurgists.

STEEL WORKS

Developments, 1923. Increase Mill Capacity in 1923, John D. Knox. Iron Trade Rev., vol. 74, no. 1, Jan. 3, 1924, pp. 50–53. Decline in open-hearth furnace which began six years ago, is checked; sheet and strip mills lead in construction of new rolling units; extensive additions proposed.

Fuel-Consuming Equipment. Economical Use of Fuel in the Steel Plant, H. C. Seibert. Assn. Iron & Steel Elec. Engrs., vol. 5, no. 11, Nov. 1923, pp. 621–644 and (discussion) 644–657. Author seeks to show that saving may be realized by improving principal fuel-consuming equipment; presents data in form of heat balances and fuel rates for principal primary and auxiliary fuel-consuming equipment now employed in steel plants; on basis of this data, he discusses thermal efficiency, principal heat losses, and means by which improvements may be effected.

STOKERS

Chain-Grate. A New Balanced Draught Stoker. Eng. & Boiler House Rev., vol. 37, no. 5, Dec. 1923, pp. 147–148, 2 figs. Describes chain-grate stoker with eight speeds, and draft and control at any point of grate, designed by Babcock and Wilcox, Ltd.

Hand. Hand Stokers Reduce Operating Labor. Power Plant Eng., vol. 28, no. 1, Jan. 1, 1924, pp. 47–49, 9 figs. Field of application; general description of action; details of construction of different makes.

Mechanical. Mechanical Stokers and Details of Furnaces for Special Fuels. Power Plant Eng., vol. 28, no. 1, Jan. 1, 1924, pp. 50–51. Utilization of mechanical stokers for burning coal in lump form and of special furnaces for burning pulverized coal, fuel oil, and gas minimizes fluctuations in firing conditions and results in increased economy.

Speed Control. Drive and Speed Control of Mechanical Stokers. Power Plant Eng., vol. 28, no. 1, Jan. 1, 1924, pp. 52–55, 8 figs. Speed-controlling devices are often actuated by air-supply mechanism to give correct proportioning of air to fuel.

Types. Mechanical Stokers for the Power Plant. Power Plant Eng., vol. 28, no. 1, Jan. 1, 1924, pp. 56–62, 24 figs. Descriptions of stoker types which meet requirements of present-day steam production.

STRAIGHTENING MACHINES

Types. Reeling and Straightening Machines, W. H. A. Robertson. Machy. (Lond.), vol. 23, nos. 575, 577 and 579, Oct. 4, 18 and Nov. 1, 1923, pp. 21–24, 81–84, and 150–151, 20 figs. Describes types of machines for straightening material after it has been hot or cold worked.

STREET RAILWAYS

Peking, China. The Peking Electric Tramway, P. Y. Tsai. Assn. Chinese & Am. Engrs.—Jl., vol. 4, no. 7, July-Sept. 1923, pp. 1–3, 6 figs. on supp. plates. Now under construction; features in connection with production, transmission, and utilization of electricity; construction costs.

STRESSES

Mechanical and Electrical. The Danger of Fracture through Mechanical and Electrical Stress of Solid Bodies (Die Bruchgefahr bei mechanischer und bei elektrischer Beanspruchung fester Körper), W. Kummer. Schweizerische Bauzeitung, vol. 82, no. 20, Nov. 17, 1923, pp. 253–255, 4 figs. The danger of fracture from electric stress and mechanical stress in single- and in double-axis state of stress; development of stress diagram.

STRIKES

Futility of Lockouts and. The Futility of Lockouts and Strikes, P. Ogilvie. Taylor Soc.—Bul., vol. 8, no. 6, Dec. 1923, pp. 219–224. Deals with settlement of disputes.

SUPERHEATERS

Sectional. A New Sectional Superheater. Power Engr., vol. 19, no. 214, Jan. 1924, p. 24, 2 figs. Describes sectional modification of Adamson-Cruse accumulator-superheater.

SUPERPOWER

Scandinavia. Inter-Scandinavian Power Distribution (Interskandinavisk Kraftoverföring), A. Angelo. Teknisk Tidskrift (Elektroteknik), vol. 53, no. 40, Oct. 6, 1923, pp. 120–136, 5 figs. Gives results of work of Scandinavian committee appointed in 1921 to investigate project; discusses financial and technical problems in connection with superpower system extending over Sweden, Norway and Denmark; main problem is transmission of power from Norway and Sweden to Denmark; discusses four main alternatives for superpower system and gives detailed description of each.

Survey, Analysis of. Super Power or Super Promises, E. Douglas. Nat. Engr., vol. 27, no. 12, Dec. 1923, pp. 758–583. A common-sense analysis of recent superpower survey. Statistics are often misleading unless they are carefully analyzed; on a basis of coal conservation private plant is still logical choice for majority of services.

T

TEMPERATURE MEASUREMENTS

Instruments. The Control and Measurement of Temperatures. Indus. Management (Lond.), vol. 10, no. 11, Nov. 29, 1923, pp. 303–304 and 306, 5 figs. Describe different types of temperature measuring instruments.

TERMINALS, RAILWAY

Buenos Aires. The Terminal Stations of Buenos Ayres, Wm. Rögind. Ry. Gaz., vol. 39, no. 26, Dec. 28, 1923, pp. 814–826, 14 figs. Extracts from paper read before S. American Ry. Congress in 1922.

TIRES, RUBBER

Low-Pressure. Present Status of the Low Pressure Tire. India Rubber World, vol. 69, no. 3, Dec. 1, 1923, pp. 143–145, 5 figs. Its development and characteristics; advantages and disadvantages; sizes in use; need of standardization.

TUBES

Cutting-Off Machine for. Designs New Cutting Off Machine, E. W. Mikaelson. Iron Trade Rev., vol. 74, no. 2, Jan. 10, 1924, pp. 173–176, 6 figs. Limited floor space is required for new unit which cuts off and reams tubing up to 14-in. diam. at rate of one a minute; automatic feeding mechanism provided.

V

VENTILATION

Requirements and Air-Testing Methods. Aerology for Amateurs and Others, E. V. Hill. Heat. & Vent. Mag., vol. 20, nos. 1, 2, 3, 4, 5, 9, 10 and 12. Jan., Feb., Mar., Apr., May, Oct., Nov. and Dec. 1923, pp. 35–39 and 49, 44–47, 43–44, 37–40, 43–45, 50–53, 39–41, and 52–55, 32 figs. Evolution of modern ventilation and its effect on present and future practice; known factors that determine suitability of air conditions to human body, their relationship and relative importance, and instruments and methods found best adapted for testing and studying same.

VIBRATIONS

Machinery. The Damping of Machine Vibrations (Ueber Dämpfung von Maschinenschwingungen), D. Thoma. Maschinenbau, vol. 3, no. 4, Nov. 22, 1923, pp. G14–G16, 4 figs. Discusses damping through radiation with aid of practical examples.

VISCOSIMETERS

Michell. New Instrument Developed to Show True Body of Oils, R. W. A. Brewer. Automotive Industries, vol. 49, no. 25, Dec. 20, 1923, pp. 1244–1245, 5 figs. Method devised for obtaining real comparison of viscosity quickly and easily without calculations; device is of cup and ball type, and its use in large number of tests is said to have resulted in great saving of time.

VOCATIONAL TRAINING

Machinists. A Worth While Vocational Training School, H. P. Armson. Can. Machy., vol. 30, no. 26, Dec. 27, 1923, pp. 136–138, 2 figs. Features of educational program of new Collegiate Inst. at St. Catharines, Ont., for giving future machinists well-rounded knowledge of their trade.

State Regulations. Vocational Education and Training. Monthly Labor Rev., vol. 17, no. 6, Dec. 1923, pp. 186–190. New apprenticeship regulations in New South Wales; vocational guidance in Brussels; vocational and other educational training by employers in Finland.

W

WASTE HEAT

Utilization. New Aspects of Waste-Heat Utilization (Neue Gesichtspunkte auf dem Gebiete der Abhitzeverwertung), H. Heller. Gas- u. Wasserfach, vol. 66, nos. 46 and 47, Nov. 17 and 24, 1923, pp. 672–674 and 683–686, 7 figs. Deals with certain problems of waste-heat utilization and discusses modern types of waste-heat installations. Influence of waste-heat boiler on chimney draft; chimney vs. induced draft, Ansbach waste-heat installation; waste-heat boiler with induced draft; hot-water supply from waste heat.

The Utilization of Waste Heat from Boiler and Drying Plants for Increasing the Efficiency of Furnaces (Die Verwertung der Abgase von Kessel- und Trockenanlagen zur Erhöhung des Wirkungsgrades der Feuerungen), H. Claassen. Archiv für Wärmewirtschaft, vol. 4, no. 11, Nov. 1923, pp. 201–203. Process and results of return of waste gases; tests on return of part of boiler waste heat underneath grate; utilization of waste heat from drying plants through return of gases.

WATER

Adiabatic Cooling of. The Adiabatic Cooling of Water and the Temperature of its Maximum Density as a Function of Pressure. N. A. Pushin and E. V. Grebenshchikov. Chem. Soc.—Jl., vol. 123–124, no. 733, Nov. 1923, pp. 2717–2725, 3 figs. Determination of coefficient of adiabatic cooling of water at various temperatures for pressures up to 4000 kg. per square cm.

WATER POWER

Project, Development of. The Development of a Water Power Project, J. C. Smith. Tech. Eng. News, vol. 4, no. 6, Dec. 1923, pp. 214–215 and 219–220. Describes development of a water power including company organization, and financial operation which provided money to carry on work.

WELDING

Electric. See ELECTRIC WELDING; ELECTRIC WELDING, ARC.

Fusion, Methods and Problems. Fusion Welding, C. B. Bellis. Chem. & Met. Eng., vol. 30, no. 1, Jan. 7, 1924, p. 17. Varieties of fusion welding; problems still to be solved.

Oxy-Acetylene. See OXY-ACETYLENE WELDING.

WORKMEN'S COMPENSATION

British Legislation. The Workmen's Compensation Act, 1923. Engineer, vol. 136, no. 3550, Jan. 11, 1924, pp. 41–42. Discusses new act which came into operation on January 1st, containing many new provisions and introducing new principles.

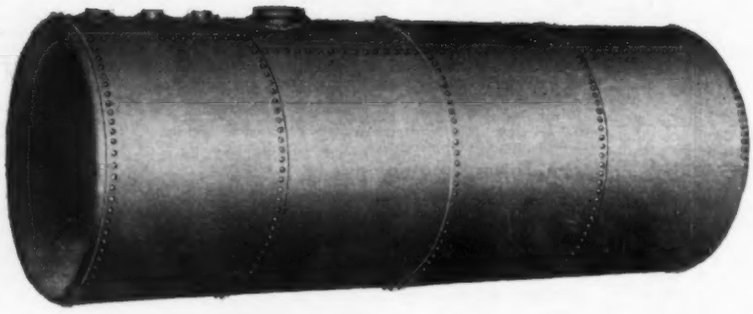
Social Insurance and. Workmen's Compensation and Social Insurance. Monthly Labor Rev., vol. 17, no. 6, Dec. 1923, pp. 163–170. Recommendations of American Federation of Labor; invalidity insurance in Denmark.

WIND MILLS

Electric Plants, Connection with. The Connection of Electric Plants with Wind Mills (Die Verbindung elektrischer Anlagen mit Windmotoren), A. Werren. Zeit. des Vereines deutscher Ingenieure, vol. 67, no. 49, Dec. 8, 1923, pp. 1097–1099, 6 figs. Discusses properties of wind; investigation of yield of energy from wind and influence of automatic regulation of wind wheel; properties of different types of d. c. and 3-phase motors are studied in relation to those of wind wheel.

WROUGHT IRON

Uses and Properties. Some Uses and Properties of Wrought Iron, S. J. Astbury. Instn. Mech. Engrs.—Proc., vol. 1, no. 3, 1923, pp. 511–516. Resistance of iron to shock and to fatigue; structure of wrought iron.



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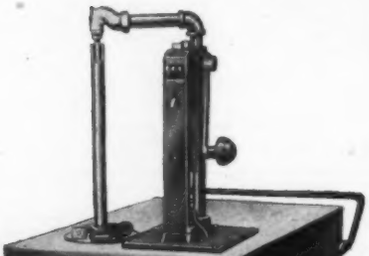

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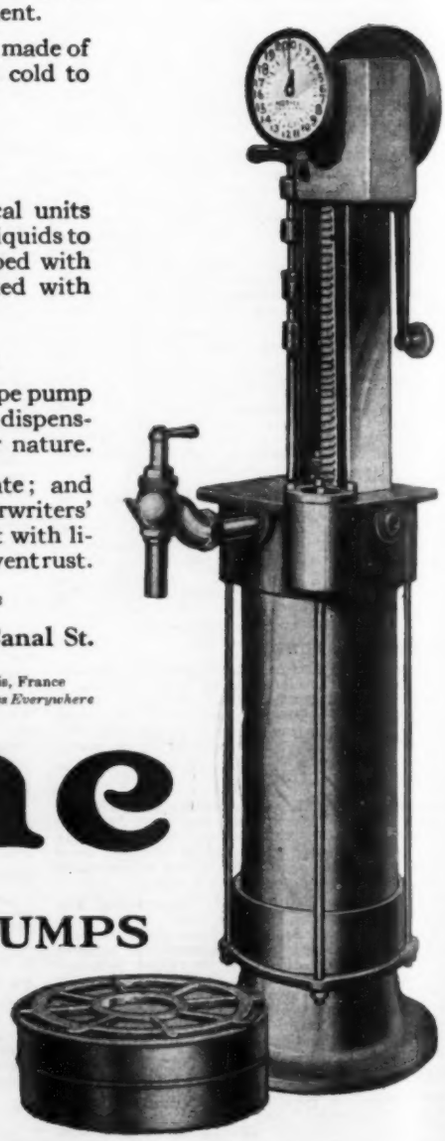

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(See also page 234 of this issue for supplementary items.)

ABRASIVE WHEELS

Diamonds for Truing, Mounting of. Mounting Diamonds by Casting. H. Miller. Abrasive Industry, vol. 5, no. 1, Jan. 1924, pp. 1–2, 2 figs. Description of a practical method.

ACCELEROMETERS

Automobile Acceleration, Measurement. New Quantitative Method of Measuring the Riding Comfort of Automobiles, F. H. Norton. Soc. Automotive Engrs.—Jl., vol. 14, no. 2, Feb. 1924, pp. 136–138, 3 figs. Discusses accelerations acting on passenger, and design of accelerometer; accuracy of readings; factors to be considered in further study.

ACCIDENTS

Industrial. Industrial Accidents and Hygiene. Monthly Labor Rev., vol. 18, no. 1, Jan. 1924, pp. 142–156. Conference on industrial accident rates called by U. S. Dept. of Labor; record of industrial accidents in United States for 1922; coke-oven accidents during 1922; accidents on steam railroads; decline in tuberculosis death rate; health conditions among chemical workers with respect to earnings.

AERONAUTICS

Developments. Aeronautics in 1923. Engineer, vol. 137, nos. 3549 and 3550, Jan. 4 and 11, 1924, pp. 22–24, and 36–38 and 44, 19 figs. partly on supp. plate. Civil aviation; light airplanes; military aeronautics; helicopters; airships; typical British airplanes.

Some Recent Developments in Aircraft Instruments, H. E. Wimperis. Roy. Aeronautical Soc.—Jl., vol. 28, no. 157, Jan. 1924, pp. 3–29 and (discussion) 29–34, 15 figs. Discusses instruments for D. R. navigation and astronomical navigation, method of reducing sextant observations, determination of height, magnetic compass, etc.

AIR COMPRESSORS

High-Speed. High-Speed Air Compressors, J. M. Walshe. Iron & Coal Trades Rev., vol. 108, no. 2916, Jan. 18, 1924, pp. 98–99. Automatic control of air output; air-cylinder lubrication; explosions in air receivers and pipes; air pipework; air receivers; turbo-compressors. Paper read before Birmingham Assn. Mech. Engrs.

AIRCRAFT

British Industry. Problems of Aircraft Production in Great Britain. Aviation, vol. 16, no. 6, Feb. 11, 1924, pp. 151–153. How Great Britain fosters her aircraft industry.

Metal Construction. The Metal Construction of Aircraft. Aeroplane, vol. 26, no. 4, Jan. 23, 1924, pp. 76 and 78 (includes discussion). Abstract of two papers on Materials in Aircraft Construction read by J. D. North and L. Aitchison before Roy. Aeronautical Soc., together forming a whole, illustrating advantages to be derived from improved materials of construction and also some of the difficulties and dangers which are to be encountered in pioneer work in this direction. See also Flight, vol. 16, no. 4, Jan. 24, 1924, pp. 48–52, 6 figs., giving a more detailed account of L. Aitchison's paper, dealing with physical qualities of metals and alloys, particularly from point of view of reliability of such materials as conditioned by margin between ideal or specification strength and real strength which is achieved in practice.

AIRPLANE ENGINES

Air-Cooled, Cylinder Gages for. Two Gages for Aero-Engine Cylinders, W. H. Thompson. Am. Mach., vol. 60, no. 8, Feb. 21, 1924, pp. 297–298, 3 figs. Describes combination gages for inspecting various dimensions on air-cooled cylinders.

Light. A New Engine for Light Planes, G. D. Angle. Aviation, vol. 16, no. 6, Feb. 11, 1924, pp. 146–147. Engine built by Steel Products Eng. Co., Springfield, O., is air-cooled 2-cylinder opposed type operating on 4-cycle principle; develops 12 to 20 hp. and weighs only 50 lb.

AIRPLANES

Ambulance. Development of Airplane Ambulances. Int. Aeronautics, vol. 1, no. 5, Dec. 1923-Jan. 1924, pp. 257–261, 8 figs. Notes on Liberty-engine Fokker, a duplicate of Macready-Kelly transcontinental machine; carries 4 litter patients, 4 sitting patients and surgeon, in addition to pilot; medical equipment.

Balancing of Moments. Practical Method for Balancing Airplane Moments, H. Hamburger. Nat. Advisory Committee for Aeronautics—Tech. Notes, no. 179, Feb. 1924, 34 pp., 8 figs. Shows how methods described in previous paper (Technische Berichte, vol. 2, no. 3, p. 463) can be practically utilized in computations; it is shown what conclusions can be drawn from diagram of moments in regard to defects in airplanes under investigation and what steps may be taken to remedy them.

C. K. 2. The Cox-Klemin C. K. 2 Training Biplane. Flight, vol. 16, no. 2, Jan. 10, 1924, p. 17, 1 fig. Two-seater side-by-side tractor biplane for training purposes built for U. S. Army Air Service; Wright model E 190-hp. engine; span 29 ft., chord 5 ft. 6 in., stagger 2 ft., wing area 293 sq. ft., speed range 47–125 m.p.h.

Commercial, Multi-Motored. France Develops Multi-Motored Transport Planes, L. D'Orcy. Aviation, vol. 16, no. 3, Jan. 21, 1924, pp. 60–64, 4 figs. Particulars of competition instituted by French air department in fall of 1922, with a view to developing multi-engined airplanes specially designed to answer requirements of long-distance air transport; data on Farman F3X, Farman F4S, Bleriot type 115, Breguet type 22, and Potez type 22, which were among the entries.

Curvilinear Flight of. Curvilinear Flight of Airplanes, E. Salkowski. Nat. Advisory Committee for Aeronautics, Technical Notes, No. 176, Jan. 1924, 21 pp., 6 figs. on supp. pages. Results of investigation by Hoff, Hopf and writer. Describes method of calculation without any assumption in regard to variation of engine power with altitude and only with assumption that this relation is, in fact, empirically known from measurements taken in altitude tests. Translated from Technische Berichte, vol. 3, no. 7, pp. 267–274.

German Commercial. Three New German Commercial Airplanes. Aviation, vol. 16, no. 6, Feb. 11, 1924, p. 155, 3 figs. Small-capacity passenger carriers with interesting features; details of Mark 4-seater, Udet 3-seater and Caspar 3-seater.

Gliders. The Magnan Monoplane Glider. Flight, vol. 16, no. 4, Jan. 24, 1924, pp. 43–44, 3 figs. Description of a French machine designed for gust-soaring, known as Type Marin M. 2; span 37 ft. 9 in., length 16 ft. 3 in., chord 4 ft. 3 in., wing area 110 sq. ft.

Gourdou-Leseurre. A Bristol "Jupiter" Makes History in France. Flight, vol. 15, no. 45, Nov. 8, 1923, 681–682, 3 figs. Particulars of Gourdou-Leseurre all-metal monoplane, designed as a single-seater fighter; streamlined Bristol "Jupiter" engine; speed of 223.7 m.p.h. attained.

Pixie. The Parnall "Pixie" Light Plain. Flight vol. 15, no. 43, Oct. 25, 1923, pp. 653–654, 4 figs. Particulars of Pixie I, with 500-cc. Douglas engine, wing area 100 sq. ft., span 28 ft. 6 in., and length 18 ft.; and Pixie II, with 750-cc. Douglas engine, wing area, 60 sq. ft., span 17 ft. 10 in., and length 18 ft.

R. V/23. The Stahlwerk-Mark R. V/23 Commercial Monoplane. Flight, vol. 16, no. 3, Jan. 17, 1924, pp. 31–32, 3 figs. Particulars of German four-seater parasol monoplane; 100-hp. 6-cylinder-in-line Mercedes engine; span 46 ft. 9 in., length 25 ft. 11 in., wing area 290.5 sq. ft.

Sesefsky. A Roumanian Aeroplane. Flight, vol. 16, no. 1, Jan. 3, 1924, pp. 3–4, 2 figs. Describes Sesefsky tractor biplane, a military machine intended for reconnaissance work; vertical triangular fin built up of multi-ply wood integral with fuselage; 250-hp. Astra-Benz engine; speed 115 m.p.h.; span 41 ft. 4 in., length 28 ft. 2 in., wing area 394 sq. ft.

Swanson-Freeman. The Swanson-Freeman SS4 Two Seater. Aviation, vol. 16, no. 4, Jan. 28, 1924, pp. 93–94, 1 fig. Equipped with 80-hp. LeRhone air-cooled rotary engine.

Udet. The New Udet Commercial Monoplane Flight, vol. 15, no. 47, Nov. 22, 1923, pp. 709–710 2 figs. Particulars of German three-seater of very clean design; a high-wing monoplane of streamline design; 70-hp. Siemens engine; span 39 ft. 4 in., length 23 ft. 10 in., wing area 212 sq. ft., maximum speed 111.6 m.p.h.

Wings. Proposal for Standardization of the Method of Computing Wing Sections, A. Gv. Paumhauer. Int. Aeronautics, vol. 1, no. 5, Dec. 1923-Jan. 1924, pp. 274–276 and 292, 2 figs. Report of Ryks-Studiedienst Voor de Luchtvaart, Amsterdam, Holland.

Note on the Relative Effect of the Dihedral and the Sweep Back of Airplane Wings, M. M. Munk. Nat. Advisory Committee for Aeronautics—Tech. Notes, no. 177, Jan. 1924, 4 pp. It appears from investigation that effect of sweep back is always smaller than that of dihedral.

AIRSHIPS

Fuel Consumption. The Compensation in Weight of Fuel Consumption of Airships, G. A. Crocco. Int. Aeronautics, vol. 1, no. 5, Dec. 1923-Jan. 1924, pp. 277–278. Condensation of combustion water.

Hydrogen vs. Helium for. Urges Hydrogen for Polar Flight. Aviation, vol. 16, no. 4, Jan. 28, 1924, pp. 95–96. Ralph Upson, in interview granted Detroit News, warns against inflation with non-inflammable helium and points out advantages of hydrogen over helium for polar flight of Shenandoah.

Italian Design. Recent Progress in Italian Airship Construction, Umberto Nobile. Aviation, vol. 16, no. 5, Feb. 4, 1924, pp. 118–122, 4 figs. The SCA, OS and PM airships; keel girder construction; power-plant arrangement; type N airship, shape of hull, and characteristics

ALLOYS

Aluminum. See ALUMINUM ALLOYS.

Non-Ferrous, Contraction. Contraction and Shrinkage of Non-Ferrous Alloys, Rob. J. Anderson. Tech. Eng. News, vol. 4, no. 7, Jan. 1924, pp. 258, 294, 296 and 298. Notes on liquid, solidification and solid shrinkage; linear contraction; factors affecting contraction of alloy on casting.

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NOTE.—The abbreviations used in indexing are as follows:

Academy (Acad.)
American (Am.)
Associated (Assoc.)
Association (Assn.)
Bulletin (Bul.)
Bureau (Bur.)
Canadian (Can.)
Chemical or Chemistry (Chem.)
Electrical or Electric (Elec.)
Electrician (Elecn.)
Engineer[s] (Engr.[s])
Engineering (Eng.)
Gazette (Gaz.)
General (Gen.)
Geological (Geol.)
Heating (Heat.)
Industrial (Indus.)
Institute (Inst.)
Institution (Instn.)
International (Int.)
Journal (Jl.)
London (Lond.)
Machinery (Machy.)
Machinist (Mach.)
Magazine (Mag.)
Marine (Mar.)
Materials (Matls.)
Mechanical (Mech.)
Metallurgical (Met.)
Mining (Min.)
Municipal (Mun.)
National (Nat.)
New England (N. E.)
Proceedings (Proc.)
Record (Rec.)
Refrigerating (Refrig.)
Review (Rev.)
Railway (Ry.)
Scientific or Science (Sci.)
Society (Soc.)
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Western, West.)

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FOR ALPHABETICAL LIST OF ADVERTISERS, SEE PAGE 150

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* Babcock & Wilcox Co.
* Bigelow Co.
* Casey-Hedges Co.
* Erie City Iron Works
* Keeler, E. Co.
* Ladd, George T. Co.
Morrison Boiler Co.
* O'Brien, John Boiler Works Co.
* Walsh & Weidner Boiler Co.
* Wickes Boiler Co.

Boxes, Carbonizing
Driver-Harris Co.

Boxes, Case Hardening
Driver-Harris Co.

Boxes, Water Service
Murdock Mfg. & Supply Co.

Brake Blocks
Johns-Manville (Inc.)

Brakes, Air
* Allis-Chalmers Mfg. Co.
* General Electric Co.

Brass Goods
* Scovill Mfg. Co.

Brass Mill Machinery
Farrel Foundry & Machine Co.

Breechings, Smoke
* Brownell Co.
Morrison Boiler Co.
* Titusville Iron Works Co.
* Vogt, Henry Machine Co.

Brick, Fire
* Bernitz Furnace Appliance Co.
* Celite Products Co.
* Drake Non-Clinkering Furnace Block Co.
Keystone Refractories Co.
* King Refractories Co. (Inc.)
Maphite Sales Corp'n
* McLeod & Henry Co.

Brick Insulating
* Celite Products Co.
* Quigley Furnace Specialties Co.

Bridges, Coal & Ore Handling
* Brown Hoisting Machinery Co.
Link-Belt Co.

Bridgewalls (Furnace)
* McLeod & Henry Co.

Buckets, Elevator
* Brown Hoisting Machinery Co.
Chain Belt Co.
* Gifford-Wood Co.
* Hendrick Mfg. Co.
* Jones, W. A. Fdry. & Mach. Co.
Link-Belt Co.

*Catalogue data of firms marked * appear in the A.S.M.E. Condensed Catalogues of Mechanical Equipment, 1923-24 Volume*

ALUMINUM ALLOYS

Airplane Structural Work. Data on Aluminum Alloys for Airplane Structural Work, Fr. H. Colvin. Am. Mach., vol. 60, no. 7, Feb. 14, 1924, pp. 235–238, 9 figs. Standardizing channels, struts and other parts for construction of all-metal planes, even in small quantities; sizes and strength of rivets; distribution of weight.

Casting-Temperature Effects. The Influence of Casting Temperature of Aluminum Alloys, F. H. Hurren. Foundry Trade Jl., vol. 29, no. 388, Jan. 24, 1924, pp. 75–79. Results of experiments. Paper read at joint meeting of Instn. British Foundrymen and Inst. Metals.

Sand-Cast. Notes on a Sand-Cast Aluminum-Copper-Nickel-Magnesium Alloy, A. J. Lyon and S. Daniels. Soc. Automotive Engrs.—Jl., vol. 14, no. 2, Feb. 1924, pp. 173–181, 12 figs. Describes foundry practice and tabulates physical properties of sand-cast aluminum-base alloy containing 4 per cent of copper, 2 per cent of nickel and 1.5 per cent of magnesium; outlines methods of heat-treating this alloy to obtain maximum hardness and tensile properties; physical testing results were obtained in connection with manufacture of pistons and air-cooled cylinder heads for aircraft engines.

APPRENTICES, TRAINING OF

Aircraft. Training of Aircraft Apprentices at Halton Camp. Engineer, vol. 137, nos. 3553, 3554 and 3555, Feb. 1, 8 and 15, 1924, pp. 119–120, 138–141 and 167–170, 21 figs., partly on p. 148 and supp. plate. Describes barracks and camp in general, and refers to special training which is given youths while in residence. Choice of apprentices; method of training; heating arrangements; water supply; sanitary and messing arrangements.

System. A Modernized Apprentice System. Machy. (N. Y.), vol. 30, no. 6, Feb. 1924, pp. 415–418, 6 figs. How apprentices are trained by Warner & Swasey Co., in shop and classroom work.

ATOMS

Structure. Some Contemporary Advances in Physics, K. K. Darrow. Bell System Tech. Jl., vol. 3, no. 1, Jan. 1924, pp. 158–178, 13 figs. Deals principally with atomic structure.

AUTOMOBILE ENGINES

Air Cleaners. Motor Vehicle Makers Give Increased Attention to Air Cleaners, W. L. Carver. Automotive Industries, vol. 50, no. 4, Jan. 24, 1924, pp. 180–183, 7 figs. Five passenger cars at New York show carried these units as standard equipment; claimed to eliminate various troubles by preventing dust from entering engine with carburetor air; four different types for car, truck, and bus use.

Crankcase Drainage Facilities. Crankcase Drainage Facility and Oil-Sump Capacity, T. A. Waerner. Soc. Automotive Engrs.—Jl., vol. 14, no. 2, Feb. 1924, pp. 260–262. Discusses means of reducing percentages of fuel dilution as follows: (1) greater accessibility for draining engine-lubricating oil; (2) greater accessibility for cleaning vital parts before reassembling, after draining used lubricating oil; and (3) more adequate consideration of crankcase oil-sump design.

Lubrication. Some Experiments in the Lubrication of Commercial-Vehicle Engines, H. D. Nickinson. Automobile Engr., vol. 14, no. 185, Jan. 1924, pp. 24–29, 12 figs. Record of commercial tests, carried out in order to ascertain if there is any difference in results obtained when using different brands of lubricating oils for internal-combustion engines, and to see if, for commercial work, it is good policy to buy expensive oil, or otherwise.

Manifold Design. Fundamental Improvements in Manifold Design, A. M. Dean, J. W. Swan and C. A. Kirkham. Soc. Automotive Engrs.—Jl., vol. 14, no. 2, Feb. 1924, pp. 139–147, 13 figs. Points out shortcomings of present manifolds and describes principle of Swan manifold, based on equal distribution of wet fuel mixtures in exactly same ratio as that delivered to manifold by carburetor; advantages claimed for manifold of this type.

Radiators. Constructing Automobile Radiators, Chas. O. Herb. Machy. (N. Y.), vol. 30, no. 6, Feb. 1924, pp. 454–459, 13 figs. Building up radiator cores of flat-fin type from brass stampings and tubes.

Specifications. American Stock Engine Specifications. Motor Transport (N. Y.), vol. 29, no. 12, Jan. 15, 1924, p. 415. Specifications of the different makes for buses, trucks, tractors, passenger cars, and rail passenger cars.

V-Type Four-Cylinder. V-Type Four Cylinder Engine Permits Compact Design, P. M. Heldt. Automotive Industries, vol. 50, no. 7, Feb. 14, 1924, pp. 337–339, 6 figs. Difficult problems involved in balance; cylinders may be placed opposite to one another or staggered; two crankshaft arrangements are possible with latter construction; size of angle determines irregularity in sequence of explosions.

AUTOMOBILE FUELS

Winter Tests. Winter Tests Show Greater Dilution with Heavy Fuels, J. A. C. Warner. Soc. Automotive Engrs.—Jl., vol. 14, no. 2, Feb. 1924, pp. 151–161, 10 figs. Report on results of winter tests by Bur. of Standards; discusses results of analyses of fresh crankcase oils and dilution results before making comparison between those obtained under summer and under winter conditions; notes on dilution vs. mileage; distillation of composite oil samples; comments upon crankcase-oil consumption.

AUTOMOBILE INDUSTRY

Standardization. Standards Committee Meeting. Soc. Automotive Engrs.—Jl., vol. 14, no. 2, Feb. 1924, pp. 189–194. Report of Electrical Equipment Division on magnet-wire specifications; and of Tire and Rim Division on balloon tires.

AUTOMOBILE MANUFACTURING PLANTS

England. Modern Production Methods. Automobile Engr., vol. 14, no. 185, Jan. 1924, pp. 15–19, 14 figs. Methods and equipment employed in manufacture of Sunbeam cars at Wolverhampton, England.

AUTOMOBILES

Ansaldo. The 14 H.p. Ansaldo Car. Auto-Motor Jl., vol. 29, no. 3, Jan. 17, 1924, pp. 49–52, 9 figs. Four-cylinder engine of capacity of 1987 cc. having cylinder bore of 72.5 mm. and stroke of 120 mm.; develops 47 hp. at 2900 r.p.m.

Axles. American Rear and Front Axle Specifications. Motor Transport (N. Y.), vol. 29, no. 12, Jan. 15, 1924, pp. 422–423. Specifications of different makes for passenger cars, buses and trucks.

Benz. New 6-Cylinder 40-hp. Car Brought Out by Benz, B. R. Dierfeld. Automotive Industries, vol. 50, no. 7, Feb. 14, 1924, pp. 332–336, 7 figs. Engine is L-head type with two $^{13}/_{16}$-in. bore and $4^{3}/_{8}$-in. stroke; radiator is V type; oil tightness of rear bearing on gear housing is secured in novel manner; maximum speed, 53 min. per hr.

Bodies. Why Not Build All-Purpose Bodies with Rear Doors? H. W. Perry. Automotive Industries, vol. 50, no. 3, Jan. 17, 1924, pp. 126–127. Suggests design for style of body that is obviously first a private passenger car body, but that is adapted for secondary purpose of carrying light loads of miscellaneous articles; side entrance for passengers would be retained and back seat cushions arranged to be folded quickly against rear of front seat.

Brakes. Four-Wheel Brakes, H. Perrot. Soc. Automotive Engrs.—Jl., vol. 14, no. 2, Feb. 1924, pp. 101–106, 4 figs. Discusses servo-brake with special reference to Perrot system; advantages of which are set forth specifically; discusses brake-system design in general and comments on brake lining, front springs and various precautionary measures that must be incorporated; explains non-use of equalizers and cites seven specific important items that should govern all four-wheel-brake design; future development of automobile chassis, as affected by present trend of brake-system practice.

Four-Wheel Braking for Cabs, W. F. Bradley. Motor Transport (Lond.), vol. 38, no. 984, Jan. 7, 1924, pp. 17–18, 5 figs. Experiences in Paris taxicab work; describes newest Parisian taxicab design, the Serex braking system, giving some details of experiences of which it is the outcome.

The Theory and Advantages of Balanced Brake Forces, Geo. L. Smith. Soc. Automotive Engrs.—Jl., vol. 14, no. 2, Feb. 1924, pp. 111–116, 4 figs. Describes two methods of brake application in use in United States, and expounds theory of balanced brake forces; practical applications of equalizing mechanism used in road tests of automobile; tests on wet pavements with study of skidding and skid-checking effects; results of tests on hills and effects of speed and pressure.

Two Types of Brakes for Front Axles Produced by Salisbury. Automotive Industries, vol. 50, no. 7, Feb. 14, 1924, pp. 344–345, 3 figs. Expanding device intended for cars weighing up to 2400 lb. and contracting for somewhat heavier models; unusual feature is use of Elliott-type steering knuckles.

Calthorpe. The 12–20 Hp. Calthorpe Chassis Automobile Engr., vol. 14, no. 185, Jan. 1924, pp. 2–9, 15 figs. Four-cylinder engine with cylinders cast in block is bolted to four-speed gear box, power being transmitted through exposed propeller shaft to spiral bevel-driven rear axle.

Chicago Show. Chicago Salon Shows Present Trends in Body Design, J. E. Schipper. Automotive Industries, vol. 50, no. 6, Feb. 7, 1924, pp. 272–275, 13 figs. Pullman exhibits all-steel model built in accordance with railway practice; Berline type seems likely to replace limousine.

Differentials. New Type Differential Prevents Traction Loss on Slippery Ground. Automotive Industries, vol. 50, no. 6, Feb. 7, 1923, p. 289, 2 figs. Permits driving wheels to rotate at unequal speeds whenever required; marketed under name of Bement drive.

Electric Equipment. Problems of Motor-Vehicle Electrical Equipment Maintenance, P. J. Durham. Soc. Automotive Engrs.—Jl., vol. 14, no. 2, Feb. 1924, pp. 162–164. Facts regarding present obstacles to proper maintenance of automotive electrical equipment; among difficulties presented are: diagnosis, headlamps, accessibility, terminal connections, fuses, wiring color code, storage battery, starting motor and generator.

Finishes. China Wood Oil Is Used as Base for Baked Color Enamel, W. L. Carver. Automotive Industries, vol. 50, no. 7, Feb. 14, 1924, pp. 324–326. New process developed at Olds Motor Works to produce several shades; only slight variation necessary from regular routine of black enameling department. Tung tree nuts, found only in inaccessible parts of China, is base of enamel.

Front-End Drives. 1924 Models Show Changing Trends in Front End Drives, J. E. Schipper. Automotive Industries, vol. 50, no. 6, Feb. 7, 1924, pp. 290–291, 7 figs. Attention has been concentrated on problem of silence and balance; of manufacturers building own engines, 47 per cent use chain and 53 per cent gear type.

Fuel Consumption. Factors in Fuel Economy, Autocar, vol. 52, no. 1472, Jan. 4, 1924, pp. 17–23, 13 figs. Describes some factors that have a distinct influence on good or bad fuel consumption; results of tests carried out on Brooklands track. (Eng.)

Glasgow Show. The Scottish Motor Exhibition. Autocar, vol. 52, no. 1475, Jan. 25, 1924, pp. 167–180, 28 figs. Data on exhibits at Glasgow show, Jan. 25-Feb. 2, 1924; representative display of British, French, Italian, American and Canadian cars. See also Auto-Motor Jl., vol. 29, no. 4, Jan. 24, 1924, pp. 77–82, 40 figs.

Lancia. The Lancia "Lambda" Car. Auto-Motor Jl., vol. 29, no. 4, Jan. 24, 1924, pp. 71–74, 12 figs. Outstanding features are construction of frame and body as one unit, and arrangement of 4-cylinder engine with pairs of cylinders set at an angle, thus keeping crankshaft very short and stiff, with minimum of whip on bearings. Weight 21 cwt. complete, 2.12-liter engine, speed 70 m.p.h.

Oakland. The New Oakland Six. Auto-Motor Jl., vol. 29, no. 1, Jan. 3, 1924, pp. 7–10, 11 figs. Fine example of 6-cylinder design; four-wheeled braking; low running costs.

Panhard. The 14–20 Hp. Panhard. Auto-Motor Jl., vol. 29, no. 2, Jan. 10, 1924, pp. 29–32, 11 figs. Details of French-built sleeve-valve-engined car.

Torque, Caring for. Taking the Torque. Auto-Motor Jl., vol. 29, no. 3, Jan. 17, 1923, pp. 55–57, 10 figs. Some examples of design in connection with taking of torque reaction in motor power transmission.

Transmission Gears. The Chandler Transmission. Auto-Motor Jl., vol. 29, no. 2, Jan. 10, 1924, p. 35, 4 figs. Describes new type of gear which will be incorporated in 1924 models of Chandler car; wheels always in mesh.

Wheel Slip Testing. Testing Wheel Slip. Autocar, vol. 52, no. 1474, Jan. 18, 1924, pp. 96–98, 3 figs. Results of trials with special instrument evolved to register action of differential.

Wood for Bodies. Wood for Automobile Bodies, A. T. Upson and L. N. Ericksen. Soc. Automotive Engrs.—Jl., vol. 14, no. 2, Feb. 1924, pp. 165–170, 3 figs. Results of survey made by U. S. Forest Products laboratory of species, kinds, grades, sizes and amounts used by automotive industry; woods used for running boards and top bows; grades of lumber used; present status of body-part standardization; quality of stock required; utilization of lumber in body plants; suitability of woods for bodies.

AVIATION

Commercial. The Practical Difficulties of Commercial Flying, E. T. Courtney. Roy. Aeronautical Soc.—Jl., vol. 28, no. 157, Jan. 1924, pp. 35–41. Considers conditions under which modern commercial airplane flies; difficulties of flying on airplane through bad weather; concludes that commercial flying, before it can be a success, must operate in any weather in which other forms of transport can operate.

Long-Distance Navigation. Recent Developments in the Navigation of the Air, H. B. Goodwin U. S. Nav. Inst.—Proc., vol. 50, no. 251, Jan. 1924, pp 68–76. Abstract of memoir of voyage by airplane accomplished by two Portuguese naval officers in spring of 1922; consideration of effect of "drift;" astronomical navigation; alternative method for zenith distance in Tropics.

B

BAGASSE

Weight Obtained Per Cent Cane. Calculation of the Bagasse Obtained Per Cent Cane, A. C. Snyder. La. Planter & Sugar Mfr., vol. 72, no. 2, Jan. 12, 1924, pp. 31–33. Method of calculating weight of bagasse obtained per-cent cane, when grinding with saturation, intended as indirect way of attaining per-cent sucrose in cane.

BALANCING

Large Rotating Apparatus. Balancing Large Rotating Apparatus, I. C. Fletcher. Elec. Jl., vol. 21, no. 1, Jan. 1924, pp. 5–10, 5 figs. Describes modern design of balancing machine and method of balancing.

BEAMS

Calculation. The Calculation of Beams Fixed at Both Ends with Special Regard to Longitudinal Strength (Zur Berechnung des beiderseits eingemauerten Trägers unter besonderer Berücksichtigung der Längskraft), F. Takabeya. Kyushu Imperial University, College of Eng.—Memoirs, vol. 2, no. 7, 1922, pp. 277–326, 28 figs. and supp. tables. Development of general equations.

BEARINGS

Babbitted. Pointers in the Casting of Babbitt Bearings, J. V. Romig. Can. Machy., vol. 31, no. 1, Jan. 3, 1924, p. 34, 4 figs. Metal must be well stirred and hot enough to ignite a dry pine sliver; white lead or smoke on shaft provides necessary clearance. See also Can. Foundryman, vol. 15, no. 1, Jan. 1923, p. 19, 4 figs.

BEARINGS, BALL

Automobile, Manufacture of. Making Ball Bearings for Automobiles, H. R. Simonds. Iron Trade Rev., vol. 74, no. 5, Jan. 31, 1924, pp. 345–349, 9 figs. Describes manufacture of radial bearings at Chicago plant of U. S. Ball Bearing Mfg. Co.

BEARINGS, ROLLER

Railway Motor Cars. New Tests with Roller Bearings on Railway Motor Cars (Neue Versuche mit Rollenlagern an Oeltriebwagen), W. Bethge. Motorwagen, vol. 27, no. 1, Jan. 10, 1924, pp. 6–7, 1 fig. Advantages and economy of roller bearings compared with journal bearings.

BLAST-FURNACE GAS

Cleaning. Dry Cleaning Blast Furnace Gas by Filtration Through Flue Dust, Geo. B. Cramp. Blast Furnace & Steel Plant, vol. 12, no. 2, Feb. 1924, pp.

Manufactured by Advertisers

CLASSIFIED LIST OF MECHANICAL EQUIPMENT

Alphabetical List on page 150

Buckets, Grab
* Brown Hoisting Machinery Co.
Clyde Iron Works Sales Co.
Lidgerwood Mfg. Co.
Link-Belt Co.

Buckets, Self-Dumping
* Brown Hoisting Machinery Co.
Clyde Iron Works Sales Co.
Link-Belt Co.

Burners, Oil
Bethlehem Shipbldg.Corp'n(Ltd.)
* Combustion Engineering Corp'n
* Schutte & Koerting Co.
* Spray Engineering Co.

Burners, Powdered Fuel
Grindle Fuel Equipment Co.
* Quigley Furnace Specialties Co.

Bushings, Bronze
* Wood's, T. B. Sons Co.

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Dietzgen, Eugene Co.
Economy Drawing Table & Mfg. Co.
Keuffel & Esser Co.
Manufacturing Equip. & Engrg. Co.
ParVell Laboratories
U. S. Blue Co.
Weber, F. Co. (Inc.)

Cableways, Excavating
Lidgerwood Mfg. Co.

Cableways, Hoisting and Conveying
Lidgerwood Mfg. Co.

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* American Schaeffer & Budenberg Corp'n
* Sarco Co. (Inc.)

Calorizing
Calorizing Co.

Cars, Charging
Easton Car & Construction Co.
* Whiting Corp'n

Cars, Industrial Railway
Easton Car & Construction Co.
Link-Belt Co.
* Whiting Corp'n

Cars, Trolley (Industrial Railway)
Link-Belt Co.

Casehardening
* American Metal Treatment Co.

Casings, Steel (Boiler)
* Brownell Co.
* Casey-Hedges Co.
* Vogt, Henry Machine Co.
* Walsh & Weidner Boiler Co.

Castings, Acid Resistant
* U. S. Cast Iron Pipe & Fdry. Co.

Castings, Aluminum
Buffalo Bronze Die Casting Corp'n
DuPont Engineering Co.

Castings, Brass
* Croll-Reynolds Engineering Co.
Du Pont Engineering Co.
* Edward Valve & Mfg. Co.

Castings, Bronze
Buffalo Bronze Die Casting Corp'n

Castings, Die-Molded
* Doehler Die-Casting Co.
Veeder Mfg. Co.

Castings, Heavy
Farrel Foundry & Machine Co.
* U. S. Cast Iron Pipe & Fdry. Co.

Castings, Iron
Bethlehem Shipbldg.Corp'n(Ltd.)
* Brown, A. & F. Co.
* Builders Iron Foundry
* Burhorn, Edwin Co.
* Casey-Hedges Co.
* Central Foundry Co.
Chain Belt Co.
* Cole, R. D. Mfg. Co.
* Croll-Reynolds Engineering Co.
DuPont Engineering Co.
* Falls Clutch & Machinery Co.
Farrel Foundry & Machine Co.
* Franklin Machine Co.
Garlock Packing Co.
* Harrisburg Fdry. & Mach. Wks.
* Jones, W. A. Fdry. & Mach. Co.
Lidgerwood Mfg. Co.
Link-Belt Co.
* Nordberg Mfg. Co.
* Pittsburgh Valve, Fdry. & Const. Co.
* Royersford Fdry. & Mach. Co.
Treadwell Engineering Co.
* U. S. Cast Iron Pipe & Fdry. Co.
* Vogt, Henry Machine Co.

Castings, Monel Metal
Driver-Harris Co., (In Canada)
* Edward Valve & Mfg. Co.

Castings, Nichrome
Driver-Harris Co.

Castings, Nickle Chromium
Driver-Harris Co.

Castings, Semi-Steel
* Builders Iron Foundry
Chain Belt Co.
* Croll-Reynolds Engrg. Co. (Inc.)
Farrel Foundry & Machine Co.
Link-Belt Co.
* Nordberg Mfg. Co.
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Mackintosh-Hemphill Co.
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(Reading Valve & Fittings Div.)
Treadwell Engineering Co.

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* Doehler Die-Casting Co.

Cement, Asbestos
Carey, Philip Co.

Cement, Iron and Steel
Smooth-On Mfg. Co.

Cement, Pipe Joint
Smooth-On Mfg. Co.

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Johns-Manville (Inc.)
* King Refractories Co. (Inc.)
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Cement, Water-Resistant
Smooth-On Mfg. Co.

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* Smidth, F. L. & Co.
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Tolhurst Machine Works

Centrifugals, Metal Drying
Tolhurst Machine Works

Centrifugals, Sugar
Fletcher Works
Tolhurst Machine Works
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Chain Belt Co.
* Diamond Chain & Mfg. Co.
* Gifford-Wood Co.
* Jones, W. A. Fdry. & Mach. Co.
Link-Belt Co.
Union Chain & Mfg. Co.
* Whitney Mfg. Co.

Chains, Block
Reading Chain & Block Corp'n

Chains, Crane
Reading Chain & Block Corp'n

Chains, Power Transmission
Baldwin Chain & Mfg. Co
Chain Belt Co.
* Diamond Chain & Mfg. Co.
Link-Belt Co.
* Morse Chain Co.
Union Chain & Mfg. Co.
* Whitney Mfg. Co.

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* Whiting Corp'n

Chimneys, Brick (Radial)
Morrison Boile Co.

Chucking Machines
* Jones & Lamson Machine Co
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* S K F Industries (Inc.)
* Whitney Mfg. Co.

Chucks, Tapping
* Whitney Mfg. Co.

Chutes
Chain Belt Co.
* Gifford-Wood Co.
* Hendrick Mfg. Co.
Link-Belt Co.

Cigar Making Machinery
* American Machine & Foundry Co.

Cigarette Making Machinery
* American Machine & Foundry Co.

Circuit Breakers
* General Electric Co.
* Westinghouse Elec. & Mfg. Co.

Circulators, Feed Water
* Schutte & Koerting Co.

Circulators, Steam Heating
* Schutte & Koerting Co.

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* Goodrich, B. F. Rubber Co.

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Electro Sun Co. (Inc.)
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New York Blue Print Paper Co.
ParVell Laboratories
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Fletcher Works
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Johnson, Carlyle Machine Co.
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* Medart Co.
Philadelphia Gear Works
* Western Engineering & Mfg. Co.
* Wood's, T. B. Sons Co.

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Pennsylvania Coal & Coke Co.

Coal and Ash Handling Machinery
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Chain Belt Co.
* Gifford-Wood Co.
Link-Belt Co.

Coal Bins
* Brown Hoisting Machinery Co.
Chain Belt Co.
Link-Belt Co.

Coal Breakers and Cleaners
Pennsylvania Crusher Co.

Coal Mine Equipment and Supplies
* General Electric Co.

Coal Mining Machinery
* General Electric Co.
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Grindle Fuel Equipment Co.

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Chain Belt Co.
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Link-Belt Co.

Coating (Metal Protecting)
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* Crane Co.
* Jenkins Bros.
Lunkenheimer Co.
* Reading Steel Casting Co. (Inc.)
(Pratt & Cady Division)
* Vogt, Henry Machine Co.

Cocks, Blow-off
* Crane Co.
Lunkenheimer Co.
* Pittsburgh Valve, Fdry. & Const. Co.
* Reading Steel Casting Co. (Inc.)
(Pratt & Cady Division)

Cocks, Three-Way and Four-Way
* American Schaeffer & Budenberg Corp'n
* Crane Co.
* Crosby Steam Gage & Valve Co.
Lunkenheimer Co.
* Pittsburgh Valve, Fdry. & Const. Co.
* Reading Steel Casting Co. (Inc.)
(Pratt & Cady Division)

Coils, Pipe
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* Vilter Mfg. Co.
* Vogt, Henry Machine Co.

Coke
Pennsylvania Coal & Coke Co.

Cold Storage Plants
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* General Electric Co.
* Goulds Mfg. Co.
* Ingersoll-Rand Co.
Mackintosh-Hemphill Co.
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* Titusville Iron Works Co.
* Wayne Tank & Pump Co.
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* De Laval Steam Turbine Co.
* General Electric Co.

Compressors, Air, Compound
* Ingersoll-Rand Co.
* Nordberg Mfg. Co.
* Worthington Pump & Machinery Corp'n

Compressors, Ammonia
* Frick Co. (Inc.)
* Ingersoll-Rand Co.
* Vilter Mfg. Co.
* Vogt, Henry Machine Co.
* Worthington Pump & Machinery Corp'n

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* De Laval Steam Turbine Co.
* General Electric Co.
* Ingersoll-Rand Co.
* Nordberg Mfg. Co.
* Worthington Pump & Machinery Corp'n

Condensers, Ammonia
* De La Vergne Machine Co.
* Frick Co. (Inc.)
* Ingersoll-Rand Co.
* Vilter Mfg. Co.
* Vogt, Henry Machine Co.

Condensers, Barometric
* Allis-Chalmers Mfg. Co.
Buffalo Steam Pump Co.
* Ingersoll-Rand Co.
* U. S. Cast Iron Pipe & Fdry. Co.
* Wheeler, C. H. Mfg. Co.
* Wheeler Condenser & Engrg. Co.
* Worthington Pump & Machinery Corp'n

Condensers, Jet
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Buffalo Steam Pump Co.
Elliott Co.
* Ingersoll-Rand Co.
* Nordberg Mfg. Co.
* Schutte & Koerting Co.
* Wheeler, C. H. Mfg. Co.
* Wheeler Condenser & Engrg. Co.
* Worthington Pump & Machinery Corp'n

Condensers, Surface
* Allis-Chalmers Mfg. Co.
Bethlehem Shipbldg.Corp'n(Ltd.)
Elliott Co.
* Ingersoll-Rand Co
* Nordberg Mfg. Co.
* Westinghouse Electric & Mfg. Co.
* Wheeler, C. H. Mfg. Co.
* Wheeler Condenser & Engrg. Co.
* Worthington Pump & Machinery Corp'n

Conduits
Johns-Manville (Inc.)

Controllers, Automatic, for Temperature or for Pressure
(See Regulators)

Controllers, Electric
* General Electric Co.
* Westinghouse Electric & Mfg. Co.

Controllers, Filter Rate
* Builders Iron Foundry
* Simplex Valve & Meter Co.

Controllers, Liquid Level
* General Electric Co.
* Simplex Valve & Meter Co.
* Tagliabue, C. J. Mfg. Co.

Converters, Steel
* Whiting Corporation

Converters, Synchronous
* Allis-Chalmers Mfg. Co.
* General Electric Co.
* Westinghouse Electric & Mfg. Co.

Conveying Machinery
* Brown Hoisting Machinery Co.
Chain Belt Co.
* Gifford-Wood Co.
* Jones, W. A. Fdry. & Mach. Co.
Link-Belt Co.

Conveying Systems, Powdered Coal
Grindle Fuel Equipment Co.

Conveyor Systems, Pneumatic
* Allington & Curtis Mfg Co.
* Sturtevant, B. F. Co.

Conveyors, Belt
* Brown Hoisting Machinery Co.
Chain Belt Co.
Gandy Belting Co.
* Gifford-Wood Co.
Link-Belt Co.

Conveyors, Bucket, Pan or Apron
* Brown Hoisting Machinery Co.
Chain Belt Co.
* Gifford-Wood Co.
* Jones, W. A. Fdry. & Mach. Co.
Link-Belt Co.

*Catalogue data of firms marked * appear in the A.S.M.E. Condensed Catalogues of Mechanical Equipment, 1923-24 Volume*

101-103, 2 figs. Careful tests and investigation of conditions at each individual blast furnace necessary in determining area of dry cleaner.

Dust Removal. Removing Dust from Blast Furnace Gases, N. H. Gellert. Iron Age, vol. 113, no. 6, Feb. 7, 1924, pp. 422–425, 1 fig. Electrolytic process installed by Colorado Fuel & Iron Co.; corona discharge produces ionized field which precipitates dust. (Abstract.) Paper read before Pueblo Soc. Engrs.

BLAST FURNACES

Hot-Blast Stoves. Theory and Calculation of Hot-Blast Stoves (Zur Theorie und Berechnung der Winderhitzer), H. Gröber. Stahl u. Eisen, vol. 44, no. 2, Jan. 10, 1924, pp. 33–39, 9 figs. Discusses physical laws according to which heat circulates in stove, and describes method by which a scientifically perfect theory and calculation can be developed; results of this work are also applicable to regenerators of open-hearth furnaces and similar industrial furnaces.

Stoves for, Heating of. Recent Experiences with Accelerated Heating of Blast-Furnace Stoves, A. Wefelscheid. Fuels & Furnaces, vol. 2, no. 1, Jan. 1924, pp. 83–84, 2 figs. (Abstract.) Translated from Stahl u. Eisen, vol. 43, p. 1339, 1923.

BOILER FEEDWATER

Air Separator. The Hickman Air Separator. West Machy World, vol. 15, no. 1, Jan. 1924, p. 42, 1 fig. Describes simple mechanical device which extracts air bubbles from feedwater just after water has passed through feedwater heater, practically eliminating interior corrosion.

Feed Regulation. Boiler Feed-Water Regulation. Southern Engr., vol. 40, no. 5, Jan. 1924, pp. 44–51, 16 figs. Describes several designs of regulators.

Heating. The Heating of Boiler Feedwater by Means of Steam Extracted from the Turbine (Réchauffage de l'eau d'alimentation de la chaudière au moyen de vapeur extraite de la turbine), A. Schlag. Revue Universelle des Mines, vol. 67, no. 1, Jan. 1, 1924, pp. 7–18, 6 figs. Calculation of actual saving of heat effected by this method.

Treatment. Boiler Corrosion and the Treatment of Boiler Feed Water, A. Winstanley. Colliery Guardian, vol. 127, nos. 3289 and 3290, Jan. 11 and 18, 1924, pp. 90–91 and 158. Pitting; lime soda process for pitting; general thinning; grooving, and other mechanical damage; treatment of boiler feedwater. From paper read before Past and Present Min. Students' Assn.

Feed Water for Efficient Boiler Operation, M. F. Newman. Combustion, vol. 10, no. 1, Jan. 1924, pp. 39–40. A principle of treating boiler feedwater to reduce to a minimum difficulties arising from impurities in water.

BOILER FIRING

Excess-Air Calculation. Calculation of Excess Air, P. Verbeck. Combustion, vol. 10, no. 1, Jan. 1924, p. 61. Method of calculating excess air in boiler installations. Translated from Chemiker Zeitung, Aug. 9, 1923, pp. 681–682.

Oil. Burning Oil and Gas under Steam Boilers. Southern Engr., vol. 40, no. 5, Jan. 1924, pp. 12–28, 37 figs. Coal versus fuel oil; oil-burning systems; types of burners and their application to boiler furnaces; operating data.

BOILER FURNACES

Air Preheating. Boiler-Test Results with Preheated Air, C. W. E. Clarke. Mech. Eng., vol. 46, no. 2, Feb. 1924, pp. 64–72, 10 figs. Data on elaborate tests recently carried out on units of Colfax station of Duquesne Light Co., showing that efficiency of unit is increased from 5 to 7 per cent by use of preheater. (Abstract.)

Anthracite-Dust-Burning. New Furnace Solves Problem of Burning Anthracite Dust, C. H. S. Tupholme. Coal Age, vol. 25, no. 5, Jan. 31, 1924, pp. 175–176, 4 figs. Difficulty in ignition and tendency to clog air passages overcome; piles at Welsh pits hitherto considered only waste now valuable.

Grates. Stationary, Shaking, Dumping Grates and Hand Stokers. Southern Engr., vol. 40, no. 5, Jan. 1924, pp. 64–74, 24 figs. Points to be remembered when selecting a grate; adaptability of various designs, how they are handled and their application to boiler furnaces.

Linings. Boiler Furnace Economies, W. H. Gaylord, Jr. Ariz. Min. Jl., vol. 7, no. 16, Jan. 15, 1924, pp. 30–32, 5 figs. How old linings are used for repairs and reconstruction.

Plastic Material for Lining Boiler Furnaces. Southern Engr., vol. 40, no. 5, Jan. 1924, pp. 9–11, 6 figs. Application of plastic materials for complete lining of new furnaces, facing of bridgewall and arches in Dutch-oven furnaces, making or lining of fire-door arches and rear arch for return tubular boilers, and baffles for all forms of water-tube boilers, as well as repairing of these parts.

BOILER OPERATION

Control Systems. Modern Systems of Boiler Control, J. B. C. Kershaw. Engineer, vol. 137, no. 3554, Feb. 8, 1924, pp. 141–144, 5 figs. Bonus systems in the boiler house and how it is applied in certain British industrial and power plants; a German scheme of bonus payments; an American method of control.

Efficiency in. Boiler-House Efficiency, Jas. T. Beard, 2nd. Power, vol. 59, no. 5, Jan. 29, 1924, pp. 168–170. Points out that high CO_2 is only one element of high overall efficiency; consideration must also be given to loss of fuel through grate, incomplete combustion and poor heat absorption due to soot, scale and leaky baffles.

Increases in Boiler Efficiency, V. Z. Caracristi. Combustion, vol. 10, no. 1, Jan. 1924, pp. 32–36, 3 figs. How they should be considered in relation to other factors to obtain lowest cost per unit of boiler output; relationship of various factors can be determined by means of three carefully prepared charts (as those illustrated).

BOILER PLANTS

Remodeling. Remodeling a Large Boiler Room. Power Plant Eng., vol. 28, no. 4, Feb. 15, 1924, pp. 221–225, 11 figs. Replacement of old boilers at St. Louis pumping station and unusual engineering problems involved.

BOILER PLATE

Alloy Steels for. Boiler Plate (Die Kesselbaustoffe), P. Goerens. Zeit. des Vereines deutscher Ingenieure, vol. 68, no. 3, Jan. 19, 1924, pp. 41–47, 11 figs. Deals with properties of unalloyed low-carbon steel and alloyed boiler plate at different temperatures, and influences of aging and recrystallization on these, which demonstrate advisability of using materials of higher limit of elongation, such as alloy steels; points out that boiler drums of maximum size and wall thickness can now be made of plain and alloy steels.

BOILERMAKING

Flanging Machine, Furnace-Mouth. Furnace Mouth Flanging Machine. Machy. (Lond.), vol. 23, no. 590, Jan. 17, 1924, pp. 521–523, 4 figs. Machine specially designed for flanging furnace mouths and manholes of marine boiler-end plates, which is used where ordinary flanging machine is not of sufficient power to flange furnace mouths or where it is fully employed on plain flanging.

France. The Trend in French Boiler Construction, G. L. Carden. Boiler Maker, vol. 24, no. 1, Jan. 1924, pp. 1–3, 2 figs. Progress as shown at Y. & A. Niclausse works; tendency to larger units; noteworthy installations.

BOILERS

Gas-Fired. Gas-Fired Boilers, J. D. Troup. Combustion, vol. 10, no. 2, Feb. 1924, pp. 110–113, 4 figs. Discussion of increasing importance of gaseous fuel as a possible or probable development of future, and of experience obtained and equipment available in use of gas for generating steam.

Heat-Balance Calculation. Discussion of the Heat Balance in Boiler Tests, A. Linguet. Paper Trade Jl., vol. 78, no. 5, Jan. 31, 1924, pp. 49–53. Discusses value of heat-balance calculations in making boiler tests. Translated from Chimie et Industrie, vol. 10, no. 5, Nov. 1923.

Hydrostatic Tests. Hydrostatic Pressure Tests on Boilers, W. H. Fittus. Power Plant Eng., vol. 28, no. 4, Feb. 15, 1924, pp. 219–220. Points out that many defects are not revealed by hydrostatic test; inspector must depend on visual examinations and hammer test.

Inspection. Proposed Rules for the Inspection of Material and Boilers. Mech. Eng., vol. 46, no. 2, Feb. 1924, pp. 100–103, 1 fig. Preliminary report of sub-committee of A.S.M.E. boiler code committee on rules for inspection of material and boilers.

Mercury-Vapor. The Emmet Mercury Vapour Plant. Engineer vol. 137, no. 3551, Jan. 18, 1924, pp. 65–68, 4 figs. General arrangements and details of plant installed at Hartford Elec. Light Co.'s station at Hartford, Conn.

The Mercury-Vapor Boiler and Turbine. Mech. Eng., vol. 46, no. 2, Feb. 1924, pp. 91–93, 3 figs. Describes plant installed at Hartford and basic idea of plant; properties of mercury vapor which make it advantageous for use in binary-vapor system; difficulties with use of mercury; recent discussion on mercury-vapor system.

Oil Firing. Oil Firing of Steam Boilers, F. Dawson. Eng. & Boiler House Rev., vol. 37, no. 7, Feb. 1924. pp. 226, 228, 230 and 232, 10 figs. Deals with fundamental economic factors in order to show advantages which oil firing offers steam user.

Scale Removal. Boiler Scale and Scale Cleaners. Southern Engr., vol. 40, no. 5, Jan. 1924, pp. 38–44, 21 figs. Formation of scale in boilers, its dangers, methods of removing scale and preventing its formation.

Settings. Boiler Setting for Economical Steaming, Z. Kogan. Sugar, vol. 26, nos. 1 and 2, Jan. and Feb. 1924, pp. 8–9 and 77–78, 15 figs. Analysis of problem from sugar engineer's standpoint.

Waste-Heat. Practical Experiences with Waste-Heat Boilers Back of Open-Hearth Furnaces (Betriebserfahrungen mit Abhitzekesseln hinter Siemens Martin-Oefen), W. Schuster. Stahl u. Eisen, vol. 44, no. 3, Jan. 17, 1924, pp. 65–71, 4 figs. Describes four different types of boiler for waste-heat utilization in open-hearth furnaces, and gives operating results of three types; problem of superheater and preheater; prospects.

Waste-Heat Boilers, C. H. Bamber. Gas World, vol. 80, no. 2059, Jan. 5, 1924, pp. 19–20. Waste-heat versus solid fuel and convection versus radiation; waste-heat boiler design; water-tube boiler for waste heat; fire-tube boiler. Paper read before Manchester and District Jr. Gas Assn.

Water Circulation in. Chasing Bubbles in a Boiler. Power, vol. 59, no. 8, Feb. 19, 1924, pp. 288–289, 6 figs. Outline of where steam forms in boiler and path of water circulation; describes glass model boiler used in study.

BOILERS, WATER-TUBE

British Developments. British Developments in Water Tube Boilers, F. Johnstone-Taylor. Power Plant Eng., vol. 28, no. 3, Feb. 1, 1924, pp. 173–174, 3 figs. New designs provide for independent circulation of water in tubes nearest fuel bed.

Clayton. The Clayton Water-Tube Boilers, W. S. Findlay. Power Engr., vol. 19, no. 215, Feb. 1924, pp. 52–53 and 62, 4 figs. Critical discussion of special features, and particularly of circulation.

Hindley Vertical. The Hindley Vertical Boiler. Engineering, vol. 117, no. 3030, Jan. 25, 1925, p. 121, 2 figs. Boiler is vertical-tube type, with superheater arranged in smoke-box above upper tube plate.

BORING MACHINES

Tires. New Tire-Boring Machine. Engineer, vol. 137, no. 3553, Feb. 1, 1924, pp. 126–127, 6 figs. New type of machine for boring and recessing locomotive and car tires.

BOXES

Fiber Shipping Cases. Fiber Shipping Case Economies, Wm. A. Vollmer. Mgt. & Administration, vol. 7, no. 2, Feb. 1924, pp. 187–193, 10 figs. Notes on standardization of packing; coördinating speed of production and packing; machinery for making packing; demonstration of best design; corrugated containers.

BRAKING

Automatic Valve Operation. Improvement of Air Apparatus in Train Control. Ry. Age, vol. 76, no. 7, Feb. 16, 1924, pp. 425–427, 3 figs. Indiana Equipment Corp. develops valves to give graduated reduction of brake-pipe pressure.

BUSES

Trolley. Railless Trolley Cars at Ipswich. Tramway & Ry. World, vol. 55, no. 3, Jan. 17, 1924, pp. 9–13, 11 figs. Description of three single-deck trolley buses with seating capacity of 30 passengers each, loaned to Ipswich Corporation Tramways (Lond.) by Railless Ltd. for demonstration purposes, because of company's considering replacement of tramway system with railless system; experiment successful.

C

CAR DUMPERS

Rotary. Rotary Car Dumper Used at Cahokia. Elec. World, vol. 83, no. 6, Feb. 9, 1924, pp. 286, 1 fig. Gondola coal-car dumper, installed in plant of Union Elec. Light & Power Co., St. Louis, is capable of dumping 50-ton car in one minute and ten seconds with one unskilled attendant and 35-hp. operating motor. See also description by E. H. Kidder in Gas-Age Rec., vol. 53, no. 4, Jan. 26, 1924, pp. 101–102, 2 figs.

Revolving Car Dumper Handles All Sizes of Open Top Cars. Ry. Rev., vol. 74, no. 5, Feb. 2, 1924, pp. 226–228, 4 figs. Details of W-S-M revolving car dumper developed to meet demand for low-capacity machine adaptable to plants where first cost of installation is governing factor, but where high efficiency, low operating cost and minimum labor are required.

CAR HEATING

Thermostat Equipment. Getting Best Results with Heater Control Equipment, L. P. Hynes. Elec. Ry. Jl., vol. 63, no. 3, Jan. 19, 1924, pp. 97–100, 4 figs. How to install, inspect, test and maintain mercury thermostat equipment in order to get best operating results and minimize maintenance expense; methods recommended as best by one manufacturer as result of experience on many properties.

CARS, FREIGHT

Inspection and Maintenance. Inspection and Maintenance of Freight Cars, E. Erickson. Ry. Mech. Engr., vol. 98, no. 2, Feb. 1924, pp. 98–100, 2 figs. Inspection of cars on arrival at receiving yard; cars coming from connections; inspection and repair in classification yards; inspection at miscellaneous loading points; inspection and repair on repair or shop tracks.

L. M. & S. Ry. Construction System. Rapid Wagon Building in Railway Works. Ry. Gaz., vol. 40, no. 1, Jan. 4, 1924, pp. 11–19, 18 figs. Describes new system installed at Derby Works of Lond. Midland & Scottish Ry. for building clearing house standard 12-ton cars.

Large-Capacity. Experimental 50-Ton Capacity German Freight Cars. Ry. Rev., vol. 74, no. 6, Feb. 9, 1924, pp. 257–259, 3 figs. New types of convertible coal cars developed as adaptations from American practice to meet economic conditions.

Types Built in 1923. Freight Cars. Ry. Rev., vol. 74, no. 1, Jan. 5, 1924, pp. 19–44, 65 figs. Representative examples of double-sheathed box, single-sheathed box, single-sheathed automobile and furniture, refrigerator, gondola, hopper, flat, steel tank, and caboose cars, and of miscellaneous freight-car equipment, built in 1923, giving principal dimensions and data, builder, and railroad built for.

CARS, PASSENGER

Long Island Ry. Features of New Long Island Cars. Elec. Ry. Jl., vol. 63, no. 5, Feb. 2, 1924, pp. 167–170, 7 figs. Framing designed to resist collapse in collision and facilitate repairs when damaged; two motors per car arranged for tap field control; length 64 ft. 5¾ in., width overall 9 ft. 10⁹/₁₆ in., seating capacity 78.

Queensland Government Rys., Australia. New Mail Trains for the Brisbane-Townsville Service, Queensland Government Railways. Ry. Gaz., vol. 40, no. 3, Jan. 18, 1924, pp. 78–81, 8 figs. Three complete trains built, each consisting of eight vehicles: 2 first-class Pullman sleepers, 2 second-class sleepers, 1 composite sleeper, 1 post office car, 1 mail and luggage van, and 1 guard's van. Brief description of each car.

Types Built in 1923. Representative Examples of Passenger Train Cars Built in 1923. Ry. Rev., vol. 74, no. 1, Jan. 5, 1924, pp. 45–49, 17 figs. Illustrations of baggage, baggage-mail, passenger-baggage, passenger, and express refrigerator cars, with data giving

Manufactured by Advertisers

CLASSIFIED LIST OF MECHANICAL EQUIPMENT

Alphabetical List on page 150

Conveyors, Chain
* Brown Hoisting Machinery Co.
Chain Belt Co.
Link-Belt Co.

Conveyors, Ice
Chain Belt Co.
* Gifford-Wood Co.
Link-Belt Co.

Conveyors, Portable
* Gifford-Wood Co.
Link-Belt Co.

Conveyors, Screw
Chain Belt Co.
* Gifford-Wood Co.
Link-Belt Co.

Cooling Ponds, Spray
* Cooling Tower Co. (Inc.)
* Schutte & Koerting Co.
* Spray Engineering Co.

Cooling Towers
* Burhorn, Edwin Co.
* Cooling Tower Co. (Inc.)
* Spray Engineering Co.
* Wheeler Condenser & Engrg. Co.
* Wheeler, C. H. Mfg. Co.
* Worthington Pump & Machinery Corp'n

Copper, Drawn
* Roebling's, John A. Sons Co.

Copper Converting Machinery
* Allis-Chalmers Mfg. Co.
* Worthington Pump & Machinery Corp'n

Counters, Revolution
* American Schaeffer & Budenberg Corp'n
* Ashton Valve Co.
* Bristol Co.
* Crosby Steam Gage & Valve Co.
Veeder Mfg. Co.

Countershafts
* Builders Iron Foundry
* Royersford Fdry. & Mach. Co.
* Wood's, T. B. Sons Co.

Couplings, Pipe
Byers, A. M. Company
* Central Foundry Co.
* Crane Co.
Lunkenheimer Co.

Coupling, Shaft (Flexible)
* Allis-Chalmers Mfg. Co.
* Brown, A. & F. Co.
* Falk Corporation
* Fawcus Machine Co.
* Jones, W. A. Fdry. & Mach. Co.
* Medart Co.
* Nordberg Mfg. Co.
* Smith & Serrell

Coupling, Shaft (Rigid)
* Allis-Chalmers Mfg. Co.
* Brown, A. & F. Co.
Chain Belt Co.
Cumberland Steel Co.
* Falls Clutch & Machinery Co.
Farrel Foundry & Machine Co.
* General Electric Co.
* Jones, W. A. Fdry. & Mach. Co.
Link-Belt Co.
* Medart Co.
* Royersford Fdry. & Mach. Co.
* Smith & Serrell
* Wood's, T. B. Sons Co.

Couplings, Universal Joint
* Wood's, T. B. Sons Co.

Coverings, Steam Pipe
Carey, Philip Co.
Johns-Manville (Inc.)

Cranes, Electric Traveling
Northern Engineering Works
* Whiting Corporation

Cranes, Floor (Portable)
Lidgerwood Mfg. Co.

Cranes, Gantry
* Brown Hoisting Machinery Co.
Link-Belt Co.
Northern Engineering Works
* Whiting Corp'n

Cranes, Hand Power
* Brown Hoisting Machinery Co.
Clyde Iron Works Sales Co.
Northern Engineering Works
* Whiting Corp'n

Cranes, Jib
* Brown Hoisting Machinery Co.
Northern Engineering Works
* Whiting Corp'n

Cranes, Locomotive
* Brown Hoisting Machinery Co.
Link-Belt Co.

Cranes, Locomotive (Crawler)
Link-Belt Co.

Cranes, Pillar
* Brown Hoisting Machinery Co.
Northern Engineering Works
* Whiting Corp'n

Cranes, Portable
* Brown Hoisting Machinery Co.
Clyde Iron Works Sales Co.
Link-Belt Co.

Crucibles, Graphite
Dixon, Joseph Crucible Co.

Crushers, Clinker
Farrel Foundry & Machine Co.

Crushers, Coal
* Allis-Chalmers Mfg. Co.
* Brown Hoisting Machinery Co.
* Gifford-Wood Co.
Link-Belt Co.
Pennsylvania Crusher Co.
* Smidth, F. L. & Co.
* Worthington Pump & Machinery Corp'n

Crushers, Hammer
Pennsylvania Crusher Co.

Crushers, Jaw
Farrel Foundry & Machine Co.
* Worthington Pump & Machinery Corp'n

Crushers, Ore and Rock
Farrel Foundry & Machine Co.
* Nordberg Mfg. Co.
Pennsylvania Crusher Co.

Crushers, Roll
Link-Belt Co.
Pennsylvania Crusher Co.
* Worthington Pump & Machinery Corp'n

Crushing and Grinding Machinery
* Allis-Chalmers Mfg. Co.
Farrel Foundry & Machine Co.
Pennsylvania Crusher Co.
* Smidth, F. L. & Co.
* Worthington Pump & Machinery Corpn'

Cupolas
* Bigelow Co.
Northern Engineering Works
* Whiting Corp'n

Cutters, Bolt
* Landis Machine Co. (Inc.)

Cutters, Milling
* Whitney Mfg. Co.

Dehumidifying Apparatus
* American Blower Co.
* Carrier Engineering Corp'n

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Clyde Iron Works Sales Co.
Lidgerwood Mfg. Co.

Diaphragms, Rubber
* United States Rubber Co.

Die Castings
(See Castings, Die Molded)

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* Landis Machine Co. (Inc.)

Dies, Punching
* Niagara Machine & Tool Works

Dies, Sheet Metal Working
* Niagara Machine & Tool Works

Dies, Stamping
* Niagara Machine & Tool Works

Dies, Thread Cutting
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(See Engines, Oil, Diesel)

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* Vogt, Henry Machine Co.

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Electro Sun Co. (Inc.)
Keuffel & Esser Co.
New York Blue Print Paper Co.
ParVell Laboratories
U. S. Blue Co.
Weber, F. Co. (Inc.)

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* Morris Machine Works

Dredging Machinery
Lidgerwood Mfg. Co.
* Morris Machine Works

Dredging Sleeve
* United States Rubber Co.

Drilling Machines, Sensitive
* Royersford Fdry. & Mach. Co.

Drilling Machines, Vertical
* Royersford Fdry. & Mach. Co.

Drills, Coal and Slate
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* Ingersoll-Rand Co.

Drills, Core
* Ingersoll-Rand Co.

Drills, Rock
* General Electric Co.
* Ingersoll-Rand Co.

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Johns-Manville (Inc.)
Manufacturing Equip. & Engrg. Co.
Murdock Mfg. & Supply Co.

Dryers, Coal
Grindle Fuel Equipment Co.

Dryers, Rotary
* Bigelow Co.
Farrel Foundry & Machine Co.
Link-Belt Co.
* Sturtevant, B. F. Co.

Drying Apparatus
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* Carrier Engineering Corp'n
* Clarage Fan Co.
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* Sturtevant, B. F. Co.

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* Clarage Fan Co.
* Sturtevant, B. F. Co.

Dust Collectors
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Dyeing Machinery
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* General Electric Co.
* Wheeler, C. H. Mfg. Co.

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* General Electric Co.
* Westinghouse Electric & Mfg. Co.

Electrical Supplies
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Chain Belt Co.
* Gifford-Wood Co.
* Jones, W. A. Fdry. & Mach. Co.
Link-Belt Co.

Elevators, Bucket & Chain
Gandy Belting Co.

Elevators, Electric
* American Machine & Foundry Co.
Northern Engineering Works

Elevators, Hydraulic
* Whiting Corp'n

Elevators Passenger and Freight
Northern Engineering Works

Elevators, Pneumatic
* Whiting Corp'n

Elevators, Portable
* Gifford-Wood Co.
Link-Belt Co.

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Link-Belt Co.

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* Nordberg Mfg. Co.
* Worthington Pump & Machinery Corp'n

Engines, Gas
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* De La Vergne Machine Co.
* Ingersoll-Rand Co.
Otto Engine Works
* Titusville Iron Works Co.
* Westinghouse Electric & Mfg. Co.

Engines, Gasoline
Otto Engine Works
* Sturtevant, B. F. Co.
* Titusville Iron Works Co.
* Worthington Pump & Machinery Corp'n

Engines, Hoisting
* Allis-Chalmers Mfg. Co.
Clyde Iron Works Sales Co.
Lidgerwood Mfg. Co.
* Morris Machine Works
* Nordberg Mfg. Co.

Engines, Kerosene
* Worthington Pump & Machinery Corp'n

Engines, Marine
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* Ingersoll-Rand Co.
Johnson, Carlyle Machine Co.
* Nordberg Mfg. Co.
* Sturtevant, B. F. Co.
* Ward, Chas. Engineering Works
* Worthington Pump & Machinery Corp'n

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Bethlehem Shipbldg.Corp'n(Ltd.)
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Engines, Marine, Steam
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* Nordberg Mfg. Co.

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Bethlehem Shipbldg.Corp'n(Ltd.)
* De La Vergne Machine Co.
* Ingersoll-Rand Co.
* Nordberg Mfg. Co.
Otto Engine Works
* Titusville Iron Works Co.
* Worthington Pump & Machinery Corp'n

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* Allis-Chalmers Mfg. Co.
Bethlehem Shipbldg.Corp'n(Ltd.)
* Nordberg Mfg. Co.
* Worthington Pump & Machinery Corp'n

Engines, Pumping
* Allis-Chalmers Mfg. Co.
* Ingersoll-Rand Co.
* Morris Machine Works
* Nordberg Mfg. Co.
* Worthington Pump & Machinery Corp'n

Engines, Steam
* Allis-Chalmers Mfg. Co.
Bethlehem Shipbldg.Corp'n (Ltd.)
* American Blower Co.
* Brownell Co.
* Clarage Fan Co.
Clyde Iron Works Sales Co.
* Cole, R. D. Mfg. Co.
* Engberg's Electric & Mech. Wks.
* Erie City Iron Works
* Harrisburg Fdry. & Mach. Wks.
* Ingersoll-Rand Co.
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Lidgerwood Mfg. Co.
Mackintosh-Hemphill Co.
* Morris Machine Works
* Nordberg Mfg. Co.
Ridgway Dynamo & Engine Co.
* Skinner Engine Co.
* Sturtevant, B. F. Co.
* Titusville Iron Works Co.
* Troy Engine & Machine Co.
* Vilter Mfg. Co.
* Westinghouse Electric & Mfg. Co.
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Engines, Steam, Automatic
* American Blower Co.
* Brownell Co.
* Clarage Fan Co.
* Engberg's Electric & Mech. Wks.
* Erie City Iron Works
* Harrisburg Fdry. & Mach. Wks.
* Leffel, James & Co.
* Skinner Engine Co.
* Sturtevant, B. F. Co.
* Troy Engine & Machine Co.
* Westinghouse Electric & Mfg. Co.

Engines, Steam, Corliss
* Allis-Chalmers Mfg. Co.
* Franklin Machine Co.
* Frick Co. (Inc.)
* Harrisburg Fdry. & Mach. Wks.
Mackintosh-Hemphill Co.
* Nordberg Mfg. Co.
* Vilter Mfg. Co.

Engine, Steam, High Speed
* American Blower Co.
* Brownell Co.
* Clarage Fan Co.
* Engberg's Electric & Mech. Wks.
* Erie City Iron Works
* Harrisburg Fdry. & Mach. Wks.
* Nordberg Mfg. Co.
* Skinner Engine Co.

*Catalogue data of firms marked * appear in the A.S.M.E. Condensed Catalogues of Mechanical Equipment, 1923-24 Volume*

principal dimensions, weight, builder, and railroad built for; illustrations of latest Pullman sleeping-car equipment.

CARS, REFRIGERATOR

Icing Stations. Engineering of Refrigeration and Development of Car Icing Stations, J. W. Inghram. West. Soc. Engrs.—Jl., vol. 29, no. 1, Jan. 1924, pp. 28–32. Fundamental principles of design and operation of plants located at intervals along main lines of trans-continental railroads, for purpose of replenishing ice in refrigerator cars.

CARBON DIOXIDE

Electrometric Determination. Investigations in Photosynthesis, H. A. Spoehr and J. M. McGee. Indus. & Eng. Chem., vol. 16, no. 2, Feb. 1924, pp. 128–130, 1 fig. Electrometric method of determining large quantities of carbon dioxide in air stream.

CARBURETORS

Schlee. The Fuel Stop of the Schlee Carburetor (Die Kraftstoffbremse des Schleevergasers), H. Wimplinger. Motorwagen, vol. 27, no. 1, Jan. 10, 1924, pp. 2–3, 4 figs. Describes use of fuel stop at light-load nozzle for purpose of automatically stopping supply of fuel from nozzle in manner desired by driver.

CASE-HARDENING

Copper Coating in. Role of Copper in Case Carburizing, O. A. Knight and E. A. Thomas. Forging—Stamping—Heat Treating, vol. 10, no. 1, Jan. 1924, pp. 17–19, 1 fig. Experimental investigation indicates that action of copper in preventing carburization at operating temperatures is physical rather than catalytic.

CAST IRON

Contraction and Piping. Relation between Contraction and Piping in Cast Iron and the Composition of the Charge, O. Bauer and K. Sipp. Metal Industry (Lond.), vol. 24, no. 4, Jan. 24, 1924, pp. 85–86, 7 figs. Experiments to ascertain relation between contraction and piping in cast iron, and composition of charge, carried out at request of technical committee of German Foundry Assn. Translated from Stahl u. Eisen.

Electric-Furnace Manufacture. Electric Furnace Iron Cheap, L. J. Barton. Foundry, vol. 52, no. 2, Jan. 15, 1924, pp. 71–72. Saving effected by use of an all-scrap charge renders electric melting costs lower than for cupola in localities where coke prices are extremely high. Paper read at Am. Foundrymen's Assn. convention.

Nickel Additions. Cast Iron Alloyed with Nickel, P. D. Merica. Foundry, vol. 52, no. 4, Feb. 15, 1924, pp. 131–133. Studies of results obtained by additions of nickel in varying percentages; hardness increased and grain structure made more dense. See also Iron Trade Rev., vol. 74, no. 8, Feb. 21, 1924, pp. 555–556.

CASTING

Feeders and Densers in. Relative Values of Feeders or Densers in Grey Iron and Malleable Iron, E. Longden. Foundry Trade Jl., vol. 29, no. 386, Jan. 10, 1924, pp. 29–33 and discussion (Jan. 17, 1924) pp. 48–49, 46 figs. Results of experiments; comparison of merits of feeders and densers, and comparison between white and grey iron treated in same way and poured into same form of mold; evidence showing effect of gases in producing unsoundness principally in grey iron.

Melting and Molding Troubles. Casting Metals, W. J. Reardon. Metal Industry (N. Y.), vol. 22, nos. 1 and 2, Jan. and Feb., 1924, pp. 7–8 and 64, 10 figs. A series of questions and answers dealing with melting and molding troubles and their solutions.

CASTINGS

Structural Weaknesses, Elimination of. The Elimination of Structural Weaknesses in Castings, O. Smalley. Foundry Trade Jl., vol. 29, no. 385, Jan. 3, 1924, pp. 5–11, 15 figs. Deals with structural weaknesses in relation to nature of crystallization of alloy on solidification and design of casting.

Transformer-Box Production. Making Transformer Castings, P. Dwyer. Foundry, vol. 52, no. 3, Feb. 1, 1924, pp. 81–85, 10 figs. Describes methods and equipment employed in Pittsfield (Mass.) foundry of Gen. Elec. Co. in making transformer boxes.

CENTRAL STATIONS

Bridgeport, Conn. Steel Point Station at Bridgeport, W. F. Thompson. Power, vol. 59, no. 7, Feb. 12, 1924, pp. 238–244, 5 figs. Simplicity and accessibility are outstanding features of new plant of United Illuminating Co.

Diesel Engines for Standby Service. Diesel Engines for Standby Service in Steam and Hydro Plants, E. B. Pollister. Elec. Light & Power, vol. 2, no. 2, Feb. 1924, pp. 24–26 and 68, 9 figs. Ideal characteristics of a standby and auxiliary prime mover; data on recent installations.

Interconnection. A New England Interconnection, R. J. Andrus. Elec. World, vol. 83, no. 3, Jan. 19, 1924, pp. 127–130, 7 figs. Principal features of study undertaken in connection with decision of Twin State Gas & Elec. Co. to interconnect St. Johnsbury (Vt.) division with Berlin (N. H.) division by a transmission line 52 m. long to provide additional capacity; saved building a steam-plant addition.

Super-Power Plants and Systems. Southern Engr., vol. 40, no. 5, Jan. 1924, pp. 1–8, 19 figs. Whereby economies in distribution of electrical energy may be obtained through interconnection of electrical systems.

London Electricity District. The North Metropolitan Electric Power Supply Company's Undertaking. Elec. Rev., vol. 94, nos. 2406 and 2407, Jan. 4 and 11, 1924, pp. 19–23 and 59–61, 19 figs. Describes additions and improvements which have been made to original installation at Brimsdown.

Mine-Operated. This Mine Power Plant Produces Power Cheaply, C. L. Moorman. Coal Age, vol. 25, no. 6, Feb. 7, 1924, pp. 210–212, 4 figs. Tests show cost to be 0.43 cents per kw-hr. under full-load conditions, 1.9 cents on idle days; stokers feed crushed refuse with washed slack; plant near Staunton, Ill., supplies power to three mines of Consolidated Coal Co. of St. Louis.

Problems. A Solution of Three Serious Central Station Problems, W. A. Layman. Rose Technic, vol. 33, no. 4, Jan. 1924, pp. 3–6 and 24–25, 3 figs. Discusses idle investment, excess system losses, and poor regulation.

CHAIN DRIVE

Roller Centers, Path of. The Path of Roller Centers in Chains, G. M. Bartlett. Machy. (Lond.), vol. 23, no. 592, Jan. 31, 1924, pp. 575–577, 5 figs. Results of investigations of paths followed by centers of chain pins when approaching and departing from sprockets both at high and low speeds.

CHIMNEYS

Reinforced-Concrete. Concrete Chimney to Serve Two Breechings, C. W. Geiger. Power Plant Eng., vol. 28, no. 4, Feb. 15, 1924, pp. 240–242, 1 fig. Brick division wall at breeching openings carried on reinforced-concrete beam placed just below these openings.

Steel. Steel Chimneys, F. Johnstone-Taylor. Power Engr., vol. 19, no. 215, Feb. 1924, pp. 45–48, 9 figs. Survey of characteristics and advantages of steel chimneys.

CHROMIUM

Applications in Chemical Industry. The Importance of Chromium to the Chemical Engineer, Chem. & Met. Eng., vol. 30, no. 4, Jan. 28, 1924, pp. 149–151. Notes on nickel-chromium alloys; chrome irons; metallic chromium.

CLUTCHES

Specifications. American Stock Clutch Specifications. Motor Transport (N. Y.), vol. 29, no 12, Jan. 15, 1924, p. 420. Specifications of different makes for buses, passenger cars, trucks, and tractors.

COAL

Classification. Classification of Coal That Will Enable Buyer to Know What Kind of Fuel He Is Getting, Geo. H. Ashley. Coal Age, vol. 25, no. 5, Jan. 31, 1924, pp. 167–171, 1 fig. Suggests that coals be divided into ten classes by percentages of fixed carbon with ash equated to 7 per cent; seven new classes added to recognized divisions; graded also for quality. Paper presented before Coal Min. Inst. Am. See also Coal Mine Mgt., vol. 3, no. 1, Jan. 1924, pp. 29–31 and 56–61.

Measurement by Volume. Coal Measurement by Volume versus Measurement by Weight, J. E. Lea. Eng. & Boiler House Rev., vol. 37, no. 6, Jan. 1924, pp. 194 and 196, 2 figs. Author points out merits of measurement by volume.

Thermal Conductivity and Specific Heat. The Thermal Conductivity and Specific Heat of Coal, F. S. Sinnatt and H. Macpherson. Fuel, vol. 3, no. 12, Jan. 1924, pp. 12–14. Method of determining thermal conductivity and specific heat.

Value for Steam Generation. The Value of Coal for Steam Generation, C. A. Joerger. Combustion, vol. 10, no. 1, Jan. 1924, pp. 59–60 and 65. Basis of determining value of a coal, and discussion of some of the items which cause confusion in terms, efficiency, economy, and capacity.

COAL HANDLING

Conveyors for. Belt Conveyors at Work, J. M. Cowan. Iron & Coal Trades Rev., vol. 108, no. 2914, Jan. 4, 1924, p. 26, 1 fig. Method of roof support for conveyor face; description of conveyors used; shifting of conveyor; gate-end loader. Paper read before East of Scotland Min. Students' Assn.

Coal Bunkers, Coal and Ash Conveyors. Southern Engr., vol. 40, no. 5, Jan. 1924, pp. 100–104, 106, 108 and 110, 16 figs. Design of coal bins, method of suspension and how lined; operation and types of coal and ash-conveying apparatus.

Power Plants. Coal and Ash Handling Systems for Power Plants, J. W. Geiger. Nat. Engr., vol. 28, no. 2, Feb. 1924, pp. 53–56. Description, advantages and disadvantages of different types of apparatus; factors to be considered in selection.

COAL STORAGE

Economic Phases. Economic Phases of Coal Storage, F. G. Tryon and W. F. McKenney. Mech. Eng., vol. 46, no. 2, Feb. 1924, pp. 73–76 and 108, 2 figs. Extent to which practice of storage has already been adopted; inducements to store offered by periodic fluctuations in price and supply of coal. (Abridged.)

COKE

Blast Furnace, Function in. Reactivity of Coke in Relation to Blast-Furnace Operation, G. St. J. Perrott and R. A. Sherman. Engrs.' Soc. West. Pa.—Proc., vol. 39, no. 10, Jan. 1924, pp. 351–369 and (discussion 370–375, 5 figs. Prevailing views as to function of coke in blast furnace and properties possessed by desirable coke; discusses problem in light of recent data secured by writers, both in laboratory and at blast-furnace plants.

Reactivity. The Reactivity (Combustibility) of Coke [Die Reaktionsfähigkeit (Verbrennlichkeit) von Koks], Hans Bahr. Stahl u. Eisen, vol. 44, nos. 1 and 2, Jan. 3 and 10, 1924, pp. 1–9 and 39–42 and (discussion) 42–48, 12 figs. Account and results of author's tests; new method for determination of reactivity; influence of carbon modifications and an artificial powdery-iron addition; conclusions.

COKE MANUFACTURE

Formation of Coke Pieces. What Occurs in the Formation of Coke, A. Thau. Chem. & Met. Eng., vol. 30, no. 5, Feb. 4, 1924, pp. 222–227, 13 figs. How propagation of coking steam is affected by varying oven conditions and what this means in coke produced.

COLD STORAGE

Plants. The Railway Cold Stores at Lyon-Perrache. Ice & Cold Storage, vol. 27, no. 310, Jan. 1924, pp. 11–13, 3 figs. Describes equipment of a French agricultural cold store to encourage local production.

Warehouse. Large Terminal and Cold-Storage Warehouse at Duluth. Eng. News-Rec., vol. 92, no. 8, Feb. 21, 1924, pp. 324–327, 4 figs. Rail and water terminal; reinforced-concrete structure with some steel framing; traffic on two levels; perishable freight; cold-storage insulation; freight-handling equipment.

CONDENSERS, STEAM

Tubes. Corrosion of Condenser Tubes, Johnstone Taylor. Mar. Eng. & Shipg. Age, vol. 29, no. 2, Feb. 1924, pp. 108–109. Recent investigations prove entrapped air to be cause of rapid corrosion.

CONDUITS

Pressure. Pressure-Conduit Tests of the Swiss Federal Railway (Kurzer Bericht über die Druckstollen-Versuche der S. B. B.), A. Schrafl. Schweizerische Bauzeitung, vol. 83, nos. 1 and 3, Jan. 5 and 19, 1924, pp. 7–10 and 27–30, 11 figs. Account of work of investigation to determine causes of failure of Ritom tunnel and expert testimony on other tunnels of Swiss Federal Ry.

CONVEYORS

Mail and Parcel Transport. Mechanical Messengers, R. Heumann. Eng. Progress, vol. 4, no. 12, Dec. 1924, pp. 254–259, 10 figs. Arrangement of pneumatic-tube plant; rope-conveyor plants, employed in business houses and smaller works where correspondence has to be distributed from one central point to different points and recollected; conveyor belts.

COOLING TOWERS

Operation. Analysis of Cooling Tower Operation, C. S. Robinson. Refrig. Eng., vol. 10, no. 6, Dec. 1923, pp. 201–204, 2 figs. Shows how an analysis of operation of cooling towers permits classification of tests, so that a comparison of the various types of towers is simple and accurate; discusses recent tests on cooling towers.

COOPERATIVE SOCIETIES

Coöperative Shingle Mills. Coöperation. Monthly Labor Rev., vol. 18, no. 1, Jan. 1924, pp. 170–178. Coöperative shingle mills in Western Washington.

CORROSION

Electrolytic De-Rusting Plant. The Removal of Rust by Electrolytic Processes, J. P. McLare. Engineering, vol. 117, no. 3027, Jan. 4, 1924, pp. 25–29, 5 figs. Results of experiments with alkaline bath; efficiency of bath; describes plant and its development; cost of installation.

Metallic. The Mechanism of Metallic Corrosion, G. D. Bengough and J. M. Stuart. World Power (formerly Beama), vol. 1 no. 1, Jan. 1924, pp. 25–34, 1 fig. Direct union with oxygen; hydrogen-displacement type of oxidation; formation of and changes in initial scale; corrosion of typical metals.

COST ACCOUNTING

Heat-Treating Department. The Complete Operation of a Practical Cost System, A. H. Gibson. Factory, vol. 32, no. 2, Feb. 1924, pp. 170–172, 234 and 236, 1 fig. Deals principally with problems of cost accounting in heat-treating department.

COTTON

Research Work. Practical Application of Research Work, E. D. Walen. Textile World, vol. 65, no. 5, Feb. 2, 1924, pp. 161–162, 4 figs. Work of Cotton Research Co.; analyzes mill problems both in mill and laboratory with coöperation of practical mill men.

COTTON MILLS

Electric Motors for. Selecting Motors for Cotton Mills, Wm. S. Maddocks. Elec. World, vol. 83, no. 6, Feb. 9, 1924, pp. 272–277, 9 figs. Reasons why standard motors suitable for other plants have been found unsatisfactory; tendencies toward individual drive continue to manifest themselves in this industry.

CRANES

Overhead Traveling, Motors for. Direct or Alternating Current for Overhead Traveling Cranes, Wm. L. Laing. Am. Mach., vol. 60, no. 4, Jan. 24, 1924, pp. 133–134. Advantages and disadvantages of each type; selecting crane motor with characteristics to fit work; speed, braking, overload capacity, service and other characteristics.

Underhung-Jib. 5-Ton Underhung-Jib Crane. Engineer, vol. 136, no. 3550, Jan. 11, 1924, pp. 48–49, 3 figs. Describes overhead traveling crane with underhung jib, object of which is to reach into adjoining bays, or even beyond end of shop in which it is installed, and thus enable loads to be lifted and transferred from shop to shop without use of tramways or trucks.

CRANKCASES

Jigs and Fixtures for. Jigs and Fixtures for Small Crankcases, A. J. Aires. Am. Mach., vol. 60, no. 5, Jan. 31, 1924, pp. 167–170, 9 figs. Locating crankcase from 4-bolt holes; centering case from center and end bearings; special sleeves for supporting crankcase walls while broaching and burnishing.

CUTTING TOOLS

Cutting Speeds. Cutting Speeds, Catlin. Eng. Production, vol. 7, no. 136, Jan. 1924, pp. 26–30, 15

Manufactured by Advertisers — CLASSIFIED LIST OF MECHANICAL EQUIPMENT — Alphabetical List on page 150

Engines, Steam, Poppet Valve
* Erie City Iron Works
* Nordberg Mfg. Co.
* Vilter Mfg. Co.

Engines, Steam, Throttling
* Brownell Co.
* Clarage Fan Co.
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Engines, Steam, Una-Flow
* Frick Co. (Inc.)
* Harrisburg Fdry. & Mach. Wks.
* Nordberg Mfg. Co.
Ridgway Dynamo & Engine Co.
* Skinner Engine Co.

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* Brownell Co.
* Harrisburg Fdry. & Mach. Wks.
* Nordberg Mfg. Co.

Engines, Steam, Vertical (Fully Enclosed, Self-Oiling)
* Clarage Fan Co.
* Engberg's Electric & Mech. Wks.
* Troy Engine & Machine Co

Engines, Steering
Bethlehem Shipbldg.Corp'n (Ltd.)
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Bethlehem Shipbldg.Corp'n (Ltd.)
* Croll-Reynolds Engrg. Co. (Inc.)
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* Vogt, Henry Machine Co.
* Wheeler Condenser & Engrg. Co.

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Clyde Iron Works Sales Co.
Lidgerwood Mfg. Co.
Link-Belt Co.

Exhaust Heads
Hoppes Mfg. Co.

Exhaust Systems
* Allington & Curtis Mfg. Co.
* American Blower Co.
* Clarage Fan Co.
* Sturtevant, B. F. Co.

Exhausters, Gas
* American Blower Co.
* Clarage Fan Co.
* General Electric Co.
* Green Fuel Economizer Co.
* Schutte & Koerting Co.
* Sturtevant, B. F. Co.

Extractors, Centrifugal
Fletcher Works
Tolhurst Machine Works

Extractors, Oil and Grease
* American Schaeffer & Budenberg Corp'n
* Kieley & Mueller (Inc.)

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Manufacturing Equipment & Engrg. Co.

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* Clarage Fan Co.
* Coppus Engineering Corp'n
* General Electric Co.
* Green Fuel Economizer Co.
Philadelphia Drying Mchry. Co.
* Sturtevant, B. F. Co.

Fans, Exhaust, Mine
* Sturtevant, B. F. Co.

Feeders, Pulverized Fuel
* Combustion Engineering Corp'n
Grindle Fuel Equipment Co.
* Smidth, F. L. & Co.

Filters, Air
Reed Air Filter Co. (Inc.)

Filters, Feed Water, Boiler
* Permutit Co.

Filters, Feed Water, Demulsifying
* Permutit Co.

Filters, Gravity
* Permutit Co.

Filters, Mechanical
* Permutit Co.

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* Bowser, S. F. & Co. (Inc.)
Elliott Co.
* General Electric Co.
Nugent, Wm. W. & Co. (Inc.)
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Filters, Pressure
* Graver Corp'n
* Permutit Co.

Filters, Water
Elliott Co.
* Graver Corp'n
* H. S. B. W.-Cochrane Corp'n
* Permutit Co.
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Filtration Plants
* Graver Corp'n
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International Filter Co.
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(See Brick, Hydrants, Fire, etc.)

Fittings, Ammonia
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* Frick Co. (Inc.)
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Lunkenheimer Co.

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Kennedy Valve Mfg. Co.
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Fittings, Hydraulic
* Crane Co.
* Pittsburgh Valve, Fdry. & Const. Co.
* Reading Steel Casting Co. (Inc.)
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(Reading Valve & Fittings Div.)
Steere Engineering Co.
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Lunkenheimer Co.
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Steere Engineering Co.
* Vogt, Henry Machine Co.

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* American Spiral Pipe Works
* Crane Co.
* Edward Valve & Mfg. Co.
Kennedy Valve Mfg. Co.
Lunkenheimer Co.
* Pittsburgh Valve, Fdry. & Const. Co.
* Reading Steel Casting Co. (Inc.)
(Reading Valve & Fittings Div.)
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Flanges, Forged Steel
Cann & Saul Steel Co.

Floor Armor
* Irving Iron Works Co.

Floor Stands
* Chapman Valve Mfg. Co.
* Crane Co.
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Cann & Saul Steel Co.

Forgings, Iron and Steel
Cann & Saul Steel Co

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Northern Engineering Works
* Whiting Corp'n

Friction Clutches, Hoists, etc.
(See Clutches, Hoists, etc., Friction)

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Link-Belt Co.
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(See Economizers, Fuel)

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* Kenworthy, Chas. F. (Inc.)
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* American Engineering Co.
* American Spiral Pipe Wks.
* Babcock & Wilcox Co.
* Bernitz Furnace Appliance Co.
* Combustion Engineering Corp'n
* Detroit Stoker Co.
* Riley, Sanford Stoker Co.

Furnaces, Case Hardening
* Kenworthy, Chas. F. (Inc.)

Furnaces, Down Draft
* O'Brien, John Boiler Works Co.

Furnaces, Electric
Detroit Electric Furnace Co.
* Kenworthy, Chas. F. (Inc.)
* Westinghouse Elect. & Mfg. Co.

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* Kenworthy, Chas. F. (Inc.)

Furnaces, Hardening
* Kenworthy, Chas. F. (Inc.)

Furnaces, Heat Treating
* General Electric Co.
* Kenworthy, Chas. F. (Inc.)

Furnaces, Melting
Detroit Electric Furnace Co.
* General Electric Co.
* Whiting Corp'n

Furnace, Non-Ferrous
Detroit Electric Furnace Co.

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Grindle Fuel Equipment Co.

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Johns-Manville (Inc.)
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* Crosby Steam Gage & Valve Co.

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* American Schaeffer & Budenberg Corp'n

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Gage Testers
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* Ashton Valve Co.
* Crosby Steam Gage & Valve Co.

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* Ashton Valve Co.
* Crosby Steam Gage & Valve Co.
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* Uehling Instrument Co.

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* American Schaeffer & Budenberg Corp'n
* Ashton Valve Co.
Bacharach Industrial Instrument Co.
* Bailey Meter Co.
* Bristol Co
* Tagliabue, C. J. Mfg. Co.
* Taylor Instrument Cos.
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* American Schaeffer & Budenberg Corp'n
* Ashton Valve Co.
* Crosby Steam Gage & Valve Co.

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Lunkenheimer Co.
* Simplex Valve & Meter Co.

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Gages, Pressure
* American Schaeffer & Budenberg Corp'n
* Ashton Valve Co.
Bacharach Industrial Instrument Co.
* Bailey Meter Co.
* Bristol Co.
* Crosby Steam Gage & Valve Co.
* Tagliabue, C. J. Mfg. Co.
* Uehling Instrument Co.

Gages, Rate of Flow
Bacharach Industrial Instrument Co.
* Bailey Meter Co.
* Builders Iron Foundry
* Simplex Valve & Meter Co.

Gages, Syphon
* Tagliabue, C. J. Mfg. Co.

Gages, Vacuum
* American Schaeffer & Budenberg Corp'n
* Ashton Valve Co.
Bacharach Industrial Instrument Co.
* Bristol Co.
* Crosby Steam Gage & Valve Co.
* Tagliabue, C. J. Mfg. Co.
* Taylor Instrument Cos.
* Uehling Instrument Co.

Gages, Water
* American Schaeffer & Budenberg Corp'n
* Ashton Valve Co.
* Bristol Co.
* Crane Co.
* Jenkins Bros.
Lunkenheimer Co.
* Reading Steel Casting Co. (Inc.)
(Pratt & Cady Division)
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* American Schaeffer & Budenberg Corp'n
* Bristol Co.
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* Cole, R. D. Mfg. Co.
Steere Engineering Co.

Gaskets
Garlock Packing Co.
* Jenkins Bros.
Johns-Manville (Inc.)
* Sarco Co. (Inc.)

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Smooth-On Mfg. Co.

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Garlock Packing Co.
* Goodrich, B. F. Rubber Co.
* United States Rubber Co.

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Steere Engineering Co.

Gates, Cut-off
Easton Car & Construction Co.
Link-Belt Co.

Gates, Sluice
* Chapman Valve Mfg. Co.
* Pittsburgh Valve, Fdry. & Const. Co

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Cann & Saul Steel Co.

Gear Cutting Machines
* Jones, W. A. Fdry. & Mach. Co.

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Gears, Bakelite
Ganschow, Wm. Co.

Gears, Cut
* Brown, A. & F. Co.
Chain Belt Co.

*Catalogue data of firms marked * appear in the A.S.M.E. Condensed Catalogues of Mechanical Equipment, 1923-24 Volume*

figs. Consideration of speeds, type of machine and tool to be used.

D

DIESEL ENGINES

French Installations. Reconstructing France by Aid of Diesel Power. Oil Engine Power, vol. 2, no. 1, Jan. 1924, pp. 6–11, 9 figs. Notes on several of large Diesel plants installed during and since war; one engine is larger than any yet built in U. S. A.

Generator Drive. Oil-Engine Driven Ship Generators in the German Navy (Der ölmotorische Antrieb von Borddynamos in der deutchen Kriegsmarine), W. Laudahn. Schiffbau, vol. 25, nos. 6 and 8, Jan. 9 and 23, 1924, pp. 157–161 and 179–187, 2 figs. The engines of the German Gen. Elec. Co. (AEG) with 12-kw. power. Results of workshop tests. For reference to previous articles in this series see Eng. Index 1922 and 1923.

Valve Setting. Setting the Valves of a Diesel Engine, H. F. Birnie and R. C. Baumann. Power Plant Eng., vol. 28, no. 3, Feb. 1, 1924, pp. 180–182, 7 figs. Describes general process of valve setting.

DRILLING MACHINES

Rotating Tables. Drilling Motor Parts on the Rotating Table, W. F. Sandmann. Am. Mach., vol. 60, no. 6, Feb. 7, 1924, pp. 197–199, 6 figs. Examples of rotating fixtures used on large variety of automotive work; construction of fixtures and principles involved in design.

DROP FORGING

Hammers. New Type of Drop Hammer for Multiple-Die Stamping. Engineer, vol. 137, no. 3554, Feb. 8, 1924, pp. 154–155, 4 figs. Brett drop hammer fitted specially for multiple-die stamping work.

E

ECONOMIZERS

High-Pressure. Advances in Economiser Practice. Power Engr., vol. 19, no. 215, Feb. 1924, pp. 63–64, 3 figs. Describes Ringstay economizer for high-pressure work.

ELECTRIC FURNACES

Advantages. Electric Industrial Heating, H. M. Drake. Engineer, vol. 137, no. 3553, Feb. 1, 1924, pp. 114–116, 4 figs. Discusses practice and experiences in America; advantages of electric heating; author advocates more extensive use of electric heating in Great Britain.

Granular-Carbon Resistor. Granular Carbon Resistor Furnaces, M. M. Austin. Indus. & Eng. Chem., vol. 16, no. 2, Feb. 1924, pp. 156–157, 2 figs. Describes two types in which some of disadvantages of such furnaces have been overcome and their construction simplified.

ELECTRIC LOCOMOTIVES

Baldwin-Westinghouse. Baldwin-Westinghouse Electric Locomotives in South America and Japan, H. R. Barnes. Baldwin Locomotives, vol. 2, no. 3, Jan. 1924, pp. 3–18, 26 figs. Describes types employed in Chile, Argentina and Japan.

1800-Hp. 4-6-6-4-Type. Electric Locomotive for the Imperial Japanese Railways. Engineering, vol. 117, no. 3030, Jan. 25, 1924, pp. 97–100, 11 figs. partly on supp. plate and p. 112. Describes locomotives supplied by English Elec. Co. of 4-6-6-4 type having motor equipments of 1800 hp.

Paris-Orleans Ry. Epoch Making Tests on New Passenger and Freight Locomotives, W. D. Bearce. Gen. Elec. Rev., vol. 27, no. 2, Feb. 1924, pp. 98–103, 9 figs. Describes tests carried out at Erie Works of Gen. Elec. Co. on two electric locomotives, viz., Paris-Orleans passenger, and freight locomotive for Mexican Ry. Co.; principal features of locomotives.

ELECTRIC RAILWAYS

Public Relations. How to Secure Better Public Relations, E. C. Hathaway. Elec. Ry. Jl., vol. 63, no. 4, Jan. 26, 1924, pp. 139–140. Bad treatment of utility corporations results from personal grievances of customers; public relations committee should make company better understood; its manager should take active part in civic affairs; correct attitude of employees important; securities should have wide distribution locally.

Spain. Progress of Electric Traction in Spain, F. A. Shepley. Elec. Traction, vol. 20, no. 1, Jan. 1924, pp. 16–17, 4 figs. Also notes on some opportunities for American manufacturers.

ELECTRIC WELDING

Boiler Construction and Repair. Electric Welding for Boiler Construction and Repairs. Eng. & Boiler House Rev., vol. 37, no. 7, Feb. 1924, pp. 238–240, 2 figs. Extent to which electric welding is applicable to boilers of all types; information regarding work already carried out.

ELECTRIC WELDING, ARC

Precision. Precision Welding, S. W. Mann. Coal Industry, vol. 7, no. 1, Jan. 1924, pp. 57–60, 3 figs. Describes process and method of repairing crankshaft known as neutralized precision weld.

Ship Construction. Applications of Arc Welding to Ship Construction, E. H. Ewertz. Mar. Eng. & Shipg. Age, vol. 29, nos. 1 and 2, Jan. and Feb. 1924, pp. 47–54 and 114–121 and 124, 4 figs. Jan.: Results of tests to determine strength of welded joints; attitude of classification societies towards application of electric welding. Feb.: Lloyd's rules and regulations for application of electric arc welding to ship construction; corrosion; bibliography.

ELEVATED RAILWAYS

Cars. Passenger Comfort the Feature of the New Chicago "L" Cars. Elec. Ry. Jl., vol. 63, no. 2, Jan. 12, 1924, pp. 55–59, 6 figs. Describes steel motor cars recently put in service by Chicago Elevated R.R.; low first cost and maintenance; plus seats, liberal ventilation, and insulation against noise and cold; wood roof necessary for overhead trolley.

ELEVATORS

Passenger, Time-Velocity Characteristics. Time-velocity Characteristics of the High-speed Passenger Elevator, Bassett Jones. Gen. Elec. Rev., vol. 27, no. 2, Feb. 1924, pp. 111–120, 5 figs. Discusses psychology of elevator passenger, physiological effect of acceleration and retardation on him, possible improvements in service through increased car velocity, quicker gate and door operation, better signal systems, and use of automatic stops; also advances method of analyzing time-velocity relations assisting in designing high-grade high-speed elevator installations.

EMPLOYEES

Rating Scales. Personal Opinion Records and Rating Scales, Henry C. Link. Indus. Mgt. (N. Y.), vol. 67, no. 2, Feb. 1924, pp. 78–80, 1 fig. Suggestions for simple rating sytem; points out value of system of recording personal opinions as substitute for or supplement to more objective production records.

EMPLOYMENT MANAGEMENT

Labor Distribution. The Decimal Method of Labor Distribution, Jos. M. Schappert. Indus. Mgt. (N. Y.), vol. 67, no. 2, Feb. 1924, p. 98. Advantages of decimal system over common fraction method; outline of decimal system which may be established to betterment of labor costs in almost any organization.

Selecting Employees. The Industrial Psychology of Individual Differences, D. A. Laird. Indus. Mgt. (N. Y.), vol. 67, no. 2, Feb. 1924, pp. 71–77, 14 figs. Discusses basic facts for selecting workers.

ENAMELING

Automobile Fenders and Bodies. Process of and Equipment for Fender and Body Enameling, G. Lefebvre. Soc. Automotive Engrs.—Jl., vol. 14, no. 2, Feb. 1924, pp. 195–208, 26 figs. Improvements in mechanical equipment and processes employed in various car-assembling plants of large automobile building company, with special attention to processes for enameling fenders and sheet-metal parts and such small parts as various stampings, forgings and malleables.

Cooking Utensils, Manufacture. Manufacturing Enameled Ware Utensils, F. G. White. Blast Furnace & Steel Plant, vol. 12, no. 2, Feb. 1924, pp. 124–126, 4 figs. Methods employed at Granite City factory of Nat. Enameling & Stamping Co.; quality of steel and careful annealing and pickling are essential to successful enameling of cooking utensils; removal of die lubricant. See also Forging—Stamping—Heat Treating, vol. 10, no. 1, Jan. 1924, pp. 43–45, 4 figs.

Electric Furnaces for. Enameling Cast-Iron Ware in Electric Furnaces, H. E. Kennedy. Chem. & Met. Eng., vol. 30, no. 5, Feb. 4, 1924, pp. 219–221, 5 figs. Advances in construction and disposition of metallic resistors have simplified use of electricity for this purpose.

Smelters. Types of Enamel Smelters, J. E. Hansen. Fuels & Furnaces, vol. 2, no. 2, Feb. 1924, pp. 141–144, 2 figs. Reverberatory and rotary smelters; experimental types.

ENGINEERING

Literature. Engineering Literature, D. McNicol. Am. Inst. Elec. Engrs.—Jl., vol. 43, no. 2, Feb. 1924, pp. 131–135. Critical review of tendencies in technical literature, with statement of some of problems of publication.

ENGINEERS

Consulting. The Costs of a Consulting Engineering Practice. Engineer, vol. 137, no. 3553, Feb. 1, 1924, pp. 113–114, 2 figs. Author points out importance of having accurate knowledge of costs of consulting-engineering practice and gives results of his own experience.

Refrigerating, Relation to Employer. Relation of the Engineer to His Employer, W. S. Vivian. Ice & Refrigeration, vol. 66, no. 1, Jan. 1924, pp. 12–16. Qualifications of engineer.

ENGINEHOUSES

Concrete Rectangular. England's First Reinforced Concrete Enginehouse, D. R. Lamb. Ry. Age, vol. 76, no. 5, Feb. 2, 1923, pp. 327–340, 8 figs. Southern Railway completes rectangular structure of novel design at Feltham, England.

Wiring and Lighting. Enginehouse Wiring and Lighting on the Santa Fe. Ry. Elec. Engr., vol. 15, no. 1, Jan. 1924, pp. 13–16, 4 figs. Wires carried in lead-coated wrought-iron water pipe, and both wall and overhead-type reflectors used; threads and fittings lead-coated by wiremen.

EVAPORATORS

Multiple-Effect. Designing an Efficient Evaporator, H. K. Moore. Chem. & Met. Eng., vol. 30, no. 7, Feb. 1924, pp. 274–278, 7 figs. Example of how fundamental principles underlying multiple-effect evaporation can be applied on commercial scale to industrial materials.

Refrigerants. Evaporating Systems for Refrigerants, W. F. Davis. Power Plant Eng., vol. 28, no. 4, Feb. 15, 1924, pp. 250–251. Points out that evaporators should have in a measure all general qualities of good steam boiler. (Abstract.) Paper read before Nat. Assn. Practical Engrs.

F

FANS

Design and Application. Some Common Faults in Fan Design and Application, F. G. Whipp. Domestic Eng. (Lond.), vol. 43, no. 12, Dec. 1923, and vol. 44, no. 1, Jan. 1924, pp. 253–259 and 17–19, 6 figs. Discusses speed of a fan, bearings, and methods of arranging fan drives.

Motors for. How to Choose Motors for Driving Industrial Fans, R. H. Rogers. Chem. & Met. Eng., vol. 30, no. 6, Feb. 11, 1924, pp. 231–233, 9 figs. Notes on utility of various types of motors and control devices that are available for fan service.

Motor Drives for Mine Fans, F. W. Cramer. Coal Industry, vol. 7, no. 1, Jan. 1924, pp. 8–11, 4 figs. Comparison of various types of motors which may be used to drive mine fans from standpoint of efficiency, speed control, initial cost and power factor.

Selection and Operation. Selection and Operation of Centrifugal Fans, Chas. L. Hubbard. Power Plant Eng., vol. 28, no. 4, Feb. 15, 1924, pp. 242–244, 2 figs. Proportioning fan to its load is vital factor in securing economy; principles of fan operation; resistances and outlet velocities.

FERROALLOYS

Micrographic Detection of Carbides. Micrographic Detection of Carbides in Ferrous Alloys, N. B. Pilling. Am. Inst. Min. & Met. Engrs.—Trans., No. 1289-S, Jan. 1924, 5 pp., 6 figs., also (abstract) Min & Metallurgy, vol. 5, no. 205, Jan. 1924, p. 31. New reagent developed for micrographic analysis of silicon steels, consisting of a dilute solution of nitric acid and methyl alcohol in nitrobenzol; action differs from that of sodium picrate in that there is no persistent deep-seated staining and solution is used cold.

FIRE EXTINGUISHERS

Types and Proper Uses. Fire Extinguishers and Their Proper Uses, H. L. Pagett. Fire & Water Eng., vol. 75, no. 2, Jan. 9, 1924, pp. 59–60 and 86–88. Classification of various types as to fires they are best suited to extinguish; arranged in three general classes of fires.

First Aid Fire Appliances, Chas. R. D'Olive. Coal Mine Mgt., vol. 3, no. 1, Jan. 1924, pp. 32–36 and 63. Describes various types of fire extinguishers.

FIRE PROTECTION

Sprinklers. Some Things to Know about a Sprinkler System, C. C. Brown. Fire & Water Eng., vol. 75, nos. 3 and 5, Jan. 16 and 30, 1924, pp. 113–114, 118–119 and 134–135; and 209–210 and 232. Discusses all phases connected with proper installation and maintenance of automatic sprinklers.

Water Curtain. The Water Curtain as a Protection against Conflagration, M. W. McIntyre. Fire & Water Eng., vol. 75, no. 1, Jan. 2, 1924, pp. 15–16 and 34, 5 figs. Describes system in use in large building in Cincinnati, O., and method employed in testing system's efficiency.

FIREBRICK

Tests. High Temperature Load and Fusion Tests of Fire Brick from the Pacific Northwest in Comparison with Other Well-Known Fire Brick, H. Wilson. Am. Ceramic Soc.—Jl., vol. 7, no 1, Jan. 1924, pp. 34–51, 10 figs. Results of tests made on 17 samples of fireclay brick from Pacific Northwest with 27 other commercial brands of fireclay, silica, magnesia, chromite, zirconia, diaspore, silicon carbide and crystalline alumina, as well as china clay and crystalline sillimanite products made at Univ. of Wash.

FLOW OF AIR

Resistance to Falling Spheres. The Resistance of Air to Falling Spheres, Rob. G. Lunnon. Lond., Edinburgh, & Dublin Philosophical Mag. & Jl. Sci., vol. 47, no. 277, Jan. 1924, pp. 173–182, 1 fig. Investigates fall of small steel balls in coal-mine shafts and gives results for dry, still air.

FLUE-GAS ANALYSIS

Computation. Computations Involving Steam in Boiler Flue Gas, F. C. Evans. Combustion, vol. 10, no. 2, Feb. 1924, pp. 118–119. Discussion of method of finding loss due to moisture in coal and due to water from combustion of hydrogen; illustrated by alignment chart for use in solving equations for the purpose given in proposed Boiler Test Code of A.S.M.E.

Interpretation of. Interpretation of Flue Gas Analysis, F. D. Harger. Combustion, vol. 10, no. 2, Feb. 1924, pp. 115–117, 4 figs. Necessity of complete flue-gas analysis as a guide to efficient combustion, end to be obtained being highest possible percentage of CO_2 without formation of CO and other combustible gases. Cautions to be observed in interpreting flue-gas analysis; losses caused by escape unburned of combustible gases and relation of loss to other loss factors.

FLYING BOATS

Aeromarine. The Aeromarine Metal-Hull Flying Boat. Flight, vol. 15, no. 47, Nov. 22, 1923, pp. 711–713, 12 figs. Commercial biplane; passenger capacity for flights of 4 hr. duration or under, 7; span, upper

Manufactured by Advertisers CLASSIFIED LIST OF MECHANICAL EQUIPMENT

Alphabetical List on page 150

* De Laval Steam Turbine Co.
Farrel Foundry & Machine Co.
* Fawcus Machine Co.
* Foote Bros. Gear & Machine Co.
* James, D. O. Mfg. Co.
Johnson, Carlyle Machine Co.
* Jones, W. A. Fdry. & Mach. Co.
Link-Belt Co.
Mackintosh-Hemphill Co.
* Medart Co.
Northern Engineering Works
Philadelphia Gear Works

Gears, Fibre
* General Electric Co.
* James, D. O. Mfg. Co.

Gears, Grinding
Farrel Foundry & Machine Co.

Gears, Helical
Farrel Foundry & Machine Co.

Gears, Herringbone
* Falk Corporation
Farrel Foundry & Machine Co.
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Gears, Machine Molded
* Brown, A. & F. Co.
Farrel Foundry & Machine Co.
* Jones, W. A. Fdry. & Mach. Co.
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Gears, Micarta
* Westinghouse Elec. & Mfg. Co.

Gears, Rawhide
Farrel Foundry & Machine Co.
Ganschow, Wm. Co.
* James, D. O. Mfg. Co.
Philadelphia Gear Works

Gears, Speed Reduction
Chain Belt Co.
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* Falk Corporation
Farrel Foundry & Machine Co.
* Fawcus Machine Co.
* Foote Bros. Gear & Machine Co.
Ganschow, Wm. Co.
* General Electric Co.
* James, D. O. Mfg. Co.
* Jones, W. A. Fdry. & Mach. Co.
* Kerr Turbine Co.
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* General Electric Co.
* Kerr Turbine Co.
* Sturtevant, B. F. Co.
* Westinghouse Electric & Mfg. Co.

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* De Laval Steam Turbine Co.
* Engberg's Electric & Mech. Wks.
* General Electric Co.
* Nordberg Mfg. Co.
Ridgway Dynamo & Engine Co.
* Westinghouse Electric & Mfg. Co.

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* Mason Regulator Co.

Governors, Engine, Oil
* Nordberg Mfg. Co.

Governors, Engine, Steam
* Nordberg Mfg. Co.

Governors, Oil Burner
* Foster Engineering Co.
* Mason Regulator Co.

Governors, Pressure
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* Foster Engineering Co.
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* Foster Engineering Co.

Governors, Water Wheel
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* Smidth, F. L. & Co.

Graphite, Flake (Lubricating)
* Dixon, Joseph Crucible Co.

Grate Bars
* Casey-Hedges Co.
* Combustion Engineering Corp'n
* Erie City Iron Works
* Titusville Iron Works Co.
* Vogt, Henry Machine Co.

Grate Bars (for Overfeed and Underfeed Stokers)
Furnace Engineering Co.

Grates, Dumping
* Brownell Co.
* Combustion Engineering Corp'n
* Titusville Iron Works Co.
* Vogt, Henry Machine Co.

Grates, Rocking
* Brownell Co.

Grates, Shaking
* Brownell Co.
* Casey-Hedges Co.
* Combustion Engineering Corp'n
* Erie City Iron Works
* Springfield Boiler Co.
* Titusville Iron Works Co.
* Vogt, Henry Machine Co.

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* Irving Iron Works Co.

Grease Cups
(See Oil and Grease Cups)

Grease Extractors
(See Separators, Oil)

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* Landis Machine Co. (Inc.)

Grinding Machines, Floor
* Builders Iron Foundry
* Royersford Fdry. & Mach. Co.

Grinding Machinery, Knife
* American Machine & Foundry Co.

Gun Metal Finish
* American Metal Treatment Co.

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* Franklin Machine Co.
* Long & Allstatter Co.

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* Ingersoll-Rand Co.

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Rockwood Sprinkler Co.

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* Falls Clutch & Machinery Co.
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Link-Belt Co.
* Medart Co.
* Royersford Fdry. & Mach. Co.
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* S K F Industries (Inc.)

Hangers, Shaft (Roller Bearing)
* Hyatt Roller Bearing Co.
* Jones, W. A. Fdry. & Mach. Co.

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* Croll-Reynolds Engineering Co.

Heat Treating
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* Croll-Reynolds Engineering Co.
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* Schutte & Koerting Co.
* Walsh & Weidner Boiler Co.
* Wheeler, C. H. Mfg. Co.
* Wheeler Cond. & Engrg. Co.
* Worthington Pump & Machinery Corp'n

Heaters, Feed Water, Locomotive (Open)
* Worthington Pump & Machinery Corp'n

Heaters, Water Supply
Herbert Boiler Co.

Heaters and Purifiers, Feed Water (Open)
* Brownell Co.
Elliott Co.
* Erie City Iron Works
* H. S. B. W.-Cochrane Corp'n
Hoppes Mfg. Co.
* Springfield Boiler Co.
* Wickes Boiler Co.
* Worthington Pump & Machinery Corp'n

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* Foster Engineering Co.

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Chain Belt Co.
Clyde Iron Works Sales Co.
* Gifford-Wood Co.
* Jones, W. A. Fdry. & Mach. Co.
Lidgerwood Mfg. Co.
Link-Belt Co.
Northern Engineering Works

Hoists, Air
* Ingersoll-Rand Co.
* Nordberg Mfg. Co.
Northern Engineering Works
* Whiting Corp'n

Hoists, Belt
Clyde Iron Works Sales Co.
Lidgerwood Mfg. Co.

Hoists, Chain
Northern Engineering Works
Reading Chain & Block Corp'n
* Yale & Towne Mfg. Co.

Hoists, Electric
* Allis-Chalmers Mfg. Co.
* American Engineering Co.
* Brown Hoisting Machinery Co.
Clyde Iron Works Sales Co.
* General Electric Co.
Lidgerwood Mfg. Co.
Link-Belt Co.
* Nordberg Mfg. Co.
Northern Engineering Works
Reading Chain & Block Corp'n
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Hoists, Gas and Gasoline
Lidgerwood Mfg. Co.

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Hoists, Locomotive & Coach
* Whiting Corp'n

Hoists, Mine
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* Nordberg Mfg. Co.

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Lidgerwood Mfg. Co.
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(See Engines, Hoisting)

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* United States Rubber Co.

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* United States Rubber Co.

Hose, Gas
* United States Rubber Co.

Hose, Gasoline
* Goodrich, B. F. Rubber Co.
* United States Rubber Co.

Hose, Metal, Flexible
Johns-Manville (Inc.)

Hose, Oil
* United States Rubber Co.

Hose, Rubber
* Goodrich, B. F. Rubber Co.
* United States Rubber Co.

Hose, Steam
* United States Rubber Co.

Hose, Suction
* United States Rubber Co.

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Humidity Control
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* Sturtevant, B. F. Co.
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Hydrants, Yard
Murdock Mfg. & Supply Co.

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* Taylor Instrument Cos.

Hygrometers
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* Taylor Instrument Cos.
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Kennedy Valve Mfg. Co.
* Reading Steel Casting Co. (Inc.)
(Pratt & Cady Division)

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Indicators, CO_2
Bacharach Industrial Instrument Co.
* Uehling Instrument Co.

Indicators, Engine
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Bacharach Industrial Instrument Co.
* Crosby Steam Gage & Valve Co.

Indicators, Sight Flow
* Bowser, S. F. & Co. (Inc.)

Indicators, SO_2
* Uehling Instrument Co.

Indicators, Speed
* American Schaeffer & Budenberg Corp'n
Veeder Mfg. Co

Injectors
* Schutte & Koerting Co.

Injectors, Air
* Croll-Reynolds Engrg. Co.

Instruments, Electrical Measuring
* General Electric Co.
* Taylor Instrument Cos.
* Westinghouse Electric & Mfg. Co.

Instruments, Oil Testing
* Tagliabue, C. J. Mfg. Co.

Instrument, Recording
* American Schaeffer & Budenberg Corp'n
* Ashton Valve Co.
Bacharach Industrial Instrument Co.
* Baily Meter Co.
* Bristol Co.
* Builders Iron Foundry
* Crosby Steam Gage & Valve Co.
* General Electric Co.
* Tagliabue, C. J. Mfg. Co.

*Catalogue data of firms marked * appear in the A.S.M.E. Condensed Catalogues of Mechanical Equipment, 1923-24 Volume*

wing 65 ft., lower wing 48 ft. 6½ in.; length overall 32 ft. 10 in.; area of upper wing with ailerons 434 sq. ft., lower wing 218 sq. ft.; high speed (at 1700 r.p.m.) 98 m.p.h.; 400-hp. Liberty engine.

Rohrbach. A Rohrbach Flying-Boat. Aeroplane, vol. 26, no. 1, Jan. 2, 1924, pp. 18–19, 4 figs. Notes on all-duralumin monoplane of very similar construction to Staaken monoplanes; equipped with two Rolls-Royce Eagle IX type engines and designed to carry 12 persons; span 95 ft. 3 in., length 54 ft. 2 in.

FOREMEN

Training. A Training Program for the Foreman, J. K. Novins. Railroad Herald, vol. 28, nos. 2 and 3, Jan. and Feb. 1924, pp. 25–30 and 26–30. Outlining study course; study plan proposed by Federal Board for Vocational Education; choosing text material for foreman conferences.

FORESTRY

Reforestation. Reforestation and Timber Conservation, J. W. Blodgett. Mech. Eng., vol. 46, no. 2, Feb 1924, pp. 59–63 and 72, 7 figs. Nation-wide reforestation policy a necessity; regrowth of timber for pulpwood and low-grade material; regrowth of timber suitable for lumber; points out that reforestation for lumber purposes is task for Federal Government; benefits to be derived from Federal reforestation of logged-off lands.

United States. The Evolution of Forest Industries in the United States, W. B. Creeley. West. Soc. Engrs.—Jl., vol. 29, no. 1, Jan. 1924, pp. 1–12. Notes on expanding scale of lumber operations and of timber use; relations of forest industries to timberland; utilization of raw material; transportation costs and lumber prices; situation of paper industry; transportation costs and reforestation; a national forestry policy.

FORGING

Collared Shaft. Calculations in Forging a Collared Shaft, C. J. Steen. Forging—Stamping—Heat Treating, vol. 10, no. 1, Jan. 1924, pp. 40–42, 10 figs. Method of calculating size of ingot and forging time; size of press and unit of forging pressure important factors.

FORGINGS

Steel. Recent Developments in Steel Forgings, J. L. Cox. Forging—Stamping—Heat Treating, vol. 10, no. 1, Jan. 1924, pp. 12–16, 13 figs. Review of developments in line of forging exceptionally large machine parts; forgings often employed to advantage in place of steel castings. Paper presented before Am. Iron & Steel Inst.

FOUNDRIES

Ingot Molds. Develop Ingot Mold Foundry, Pat Dwyer. Foundry, vol. 52, no. 4, Feb. 15, 1924, pp. 125–130, 9 figs. Practice at foundry of Vulcan Mold & Iron Co., Latrobe, Pa.; in addition to solid molds made in dry sand and poured vertically, split molds are made in halves in green sand and poured horizontally.

FREIGHT HANDLING

Perishable Freight. Transportation of Perishable Freight, G. H. Nelson. West. Soc. Engrs.—Jl., vol. 29, no. 1, Jan. 1924, pp. 23–27. Describes traffic and way it is handled.

FUEL ECONOMY

Railways. Personnel in Fuel Economy, U. L. Richards. Railroad Herald, vol. 28, no. 2, Jan. 1924, pp. 31–32. Education and selection of employees. Extract from prize-winning paper in Int. Ry. Fuel Assn. contest. See also Ry. & Locomotive Eng., vol. 37, no. 1, Jan. 1924, pp. 7–12.

FUELS

Research. The Work of the Fuel Research Board, C. H. Lander. Colliery Guardian, vol. 127, no. 3291, Jan. 25, 1924, pp. 213–214. Physical and chemical survey of national coal resources; carbonization of coal; H. M. fuel research station; low-temperature and high-temperature carbonization; etc. Paper read before Midland Inst. Min. Engrs. See also Iron & Coal Trades Rev., vol. 108, no. 2916, Jan. 18, 1924, pp. 87–88.

[See also BAGASSE; COAL; COKE; OIL FUEL; PULVERIZED COAL.]

FURNACES, FORGING

Heat Economy. Heat Economy of Coal Fired Rolling and Forging Furnaces. Fuels & Furnaces, vol. 2, no. 2, Feb. 1924, pp. 119–121. Heat distribution, economy and coal consumption of various types of furnaces with brick recuperators, cast-iron recuperators and waste-heat boilers.

FURNACES, HEATING

Rail-Heating. Rails Heated for Rerolling in Stoker Fired Furnaces, Elmer C. Cook. Fuels & Furnaces, vol. 2, no. 1, Jan. 1924, pp. 27–29, 1 fig. Continuous furnaces at Sweet's Steel Co. used in recovery of oil rails.

Oil- and Gas-Heated. Recuperation for Oil and Gas Heated Furnaces, A. E. Walden. Gas Age-Rec., vol. 53, no. 4, Jan. 26, 1924, pp. 97–98 and 122, 3 figs. Design of industrial heating furnaces for increased economy in operation.

FURNACES, HEAT TREATING

Electric. Electric Furnaces, With Special Reference to the Heat Treatment of Steel, L. W. Wild. Eng. Production, vol. 7, no. 136, Jan. 1924, pp. 20–23, 11 figs. Discusses hardening, normalizing, annealing, tempering, and carburizing, and suitable furnaces.

Heating Curves. Characteristics of Heating Curves, Their Applicability for Calculating the Time Required to Reach Constant Head Temperatures, E. J. Janitzky. Am. Soc. Steel Treating—Trans., vol. 5, no. 2, Feb. 1924, pp. 201–208, 2 figs. Method of calculating time required to bring bodies of steel up to constant-head temperature of furnace.

G

GAGES

Optical. Hilger Optical Gauges. Engineering, vol. 137, no. 3027, Jan. 4, 1924, p. 10, 3 figs. Designed during war for testing cylindrical tubes of eye-pieces of telescopes which are made in standard dimensions.

GAS ENGINES

Exhaust-Gas Utilization. Waste Exhaust-Gas and Its Utilization, V. L. Maleev. Oil Engine Power, vol. 2, no. 1, Jan. 1924, pp. 18–20, 2 figs. Details of tests carried out in connection with 160-b.hp. gas engine in shops of West. Mach. Co., Los Angeles.

GAS HOLDERS

Oxy-Acetylene Welding. Gas Holder Seams Welded by Oxy-Acetylene Torch, G. O. Carter. Gas Age-Rec., vol. 53, no. 3, Jan. 19, 1924, pp. 69–72, 8 figs. Describes work on a 50,000-cu. ft. holder.

GASES

Compressibility to High Pressures. The Compressibility of Five Gases to High Pressures, P. W. Bridgman. Am. Acad. Arts & Sciences—Proc., vol. 59, no. 8, Jan. 1924, pp. 173–211, 5 figs. Results of measurements of compressibility of hydrogen, helium, ammonia, nitrogen, and argon, to pressures varying from 12,000 to 15,000 kg./cm². References.

GASOLINE

Distillation Test. The Distillation Test of Gasoline, W. G. Clark. Natural Gas, vol. 5, no. 1, Jan. 1924, pp. 22 and 61. How actual making of test is accomplished; gasoline specifications.

GASOLINE ENGINES

Radiotelegraph Equipment. A Petrol Engine for Wireless Telegraph Equipment. Engineering, vol. 117, no. 3029, Jan. 18, 1924, p. 76, 5 figs. Describes small engines constructed by J. W. Brooke & Co.

GEARS

Chucking. Better Ways of Chucking Gears for Grinding. Can. Machy., vol. 31, no. 1, Jan. 3, 1924, pp. 21–23, 14 figs. Every care must be taken in selection of material, preparation of blanks, setting and cutting on machine, heat treatment and bore-grinding operation.

Design. A New Chart for the Design of Spur Gears, H. E. Merritt. Machy. (Lond.), vol. 23, no. 588, Jan. 3, 1924, pp. 457–458, 4 figs. Chart includes all variables introduced in gear-design calculations, and being composed of straight lines throughout, gives results of great degree of accuracy; will cover all possible dimensions, speeds, and stresses met with in practice.

Gears. Maschinenbau, vol. 3, no. 7, Jan. 10, 1924. Contains following articles: High-Grade Spur-Wheel Gear (Hochwertige Stirnradgetriebe mit Pfeilverzahnung), E. Meyer, pp. 159–163, 7 figs.; Use of Gears in the Reconstruction of Power Plants (Verwendung von Zahnradgetrieben bei Umbauten von Kraftanlagen), H. Klein, pp. 163–166, 8 figs.; Determination of Duration of Contact in Spur Gears (Bestimmung der Eingriffsdauer bei Stirnrädern), J. Dalchau, pp. 166–168, 5 figs.; Aspects for the Design of Friction Gears (Einige Gesichtspunkte für die Konstruktion von Reibungstrieben), G. Sachs, pp. 168–175, 30 figs.; Differential Gear (Differentialgetriebe), C. v. Dobbeler, pp. 175–177, 4 figs.

Specifications. American Stock Gearset Specifications. Motor Transport (N. Y.), vol. 29, no. 12, Jan. 15, 1924, p. 421. Specifications of different makes for passenger cars, buses, trucks and tractors.

Worm Reduction. Worm Gear: Its Production and Efficiency and Its Application to Turbine Reduction Gearing, F. W. Lanchester. Engineering, vol. 117, no. 3031, Feb. 1, 1924, pp. 131–132. Author is not impressed with prospects of general use of worm gear as turbine reduction gearing. Report on efficiency tests made on work and worm wheel for Daimler Co. is appended.

GLUES

Casein. Casein Glues for Automobile-Body Assembly, W. A. Henderson. Soc. Automotive Engrs.—Jl., vol. 14, no. 2, Feb. 1924, pp. 186–187. Casein vs. animal glue; water and heat-resisting qualities.

GRAIN ELEVATORS

Pneumatic. Pneumatic Grain Elevators, W. Cramp and A. Priestley. Engineer, vol. 137, nos. 3550, 3551, 3552 and 3553, Jan. 11, 18, 25 and Feb. 1, 1924, pp. 34–36, 64–65, 89–90 and 112–113, 7 figs. Results of investigation at University of Manchester; suggests rational basis for future design. Jan. 11: Force exerted by air on grain and resulting velocities; grain velocity and air pressure. Jan. 18: Work on pneumatic conveyor and other work done by air; experimental plant used in tests of vertical pneumatic elevator. Jan. 25: Friction of grain on pipe; nozzles. Feb. 1: General method for design of plants; use of auxiliary air inlet in nozzles; application of formulas to other materials and media and to problem of horizontal conveyors.

GREASES

Kinds and Uses. The Kinds and Specialized Uses of Grease, F. A. Hobb. Oil News, vol. 12, no 1, Jan. 1924, pp. 14–15. Account of grades and individual merits of greases.

GRINDING

Wheel- Forming Fixtures. Simplifying Form Grinding in Machine Shops, A. R. Noble. Can. Machy., vol. 31, no. 1, Jan. 3, 1924, pp. 33 and 46, 4 figs. Description of wheel-forming fixtures which have been successfully employed for various classes of work.

GRINDING MACHINES

Gear. A Full-Automatic Gear Grinder with Adjustable Involute Control. West. Machy. World, vol. 15, no. 1, Jan. 1924, pp. 31–33, 6 figs. Describes machine used in manufacture of ground involute gears, built by Fellows Gear Shaper Co., Springfield, Vt.

Internal. European Abrasive Equipment, B. Schapira. Abrasive Industry, vol. 5, no. 1, Jan. 1924, pp. 24–25, 5 figs. Describes horizontal and vertical-spindle internal grinders.

H

HARDNESS

Definitions. Definitions of Hardness, C. A. Beckett. Machy. (N. Y.), vol. 30, no. 7, Mar. 1924, pp. 503–505. Gives number of hardness definitions and methods of determining hardness, as defined or employed by various experimenters, such as wear, scratch hardness, rebound, crushing, bending, penetration, impact hardness test; time as related to hardness testing; various definitions of hardness.

HEAT TREATING

Gear Blanks. Heat Treating Gear Blanks, R. L. Manier. Fuels & Furnaces, vol. 2, no. 2, Feb. 1924, pp. 161–163, 2 figs. Automatic proportioning system used in firing normalizing and carburizing furnaces at New Process Gear Corp.

Shop for. Modernizes Heat Treating Shop, E. F. Ross. Iron Trade Rev., vol. 74, no. 8, Feb. 21, 1924, pp. 541–545, 6 figs. Rochester gear manufacturer installs new high-temperature continuous automatic electric furnace for hardening high-speed gear-cutting tools.

HEATING, HOT-WATER

Institution Plant. An Institution Hot-Water Plant. Power Engr., vol. 19, no. 215, Feb. 1924, pp. 57–62, 14 figs. Arrangements for warming scattered buildings, wards of average-sized institution for poor, and for supply of hot water for domestic purposes.

HOBBING MACHINES

Gear. New Hobbing Machine Specially Designed to Rough and Finish Gears. Automotive Industries, vol. 50, no. 7, Feb. 14, 1924, pp. 347–348, 3 figs. Machine made by Gould & Eberhardt can be used for production of both spur and helical types in quantities; also adapted to diversified range of work.

New Gear Hobber. Iron Age, vol. 113, no. 5, Jan. 31, 1924, pp. 361–362, 3 figs. Machine for quantity production of spur and helical gears; drive arrangement a feature.

HYDRAULIC TURBINES

Norway Power Station. The Turbines at Ranaasfoss Power Station, Norway, H. Thoresen. Engineer, vol. 136, nos. 3551 and 3552, Jan. 18 and 25, 1924, pp. 60–63 and 86–88, 27 figs. partly on supp. plate. Determination of size of units and choice of type of turbine; description of turbines. Jan. 25: Efficiency tests and testing arrangements; test results.

HYDROELECTRIC DEVELOPMENTS

Austria 1923. The Status of Hydroelectric Development in Austria at the End of 1923 (Die Grosswasserkraftverwertung in Oesterreich nach dem Stande Ende Dezember 1923). Elektrotechnik u. Maschinenbau, vol. 42, no. 2, Jan. 13, 1924, pp. 20–23. Statistical data on hydroelectric plants completed and under construction, and their output.

Canada. Hydro-Electric Progress in Canada, 1923. Can. Engr., vol. 46, no. 4, Jan. 22, 1924, pp. 177–178. Review of principal water-power developments in Canada; works under construction or actively in prospect; about 255,000 hp. were added during year, bringing total installation to 3,228,000 hp.

Davis Bridge Project, Vermont. Davis Bridge Power Project to Develop 60,000 Hp., A. C. Eaton. Eng. News-Rec., vol. 92, no. 4, Jan. 24, 1924, pp. 142–146, 8 figs. New England power-system unit to produce 390,000,000 kw-hr. annually on Deerfield River; in 70 mi. 1700 ft. of head are to be utilized; major unit is 200-ft. earth dam, highest on record.

Equipment Selection. Hydro-Electric Development with Special Reference to the Hydraulic Equipment, W. M. White. Boston Soc. Civ. Engrs.—Jl., vol. 11, no. 1, Jan. 1924, pp. 1–16 and (discussion) 16–20, 9 figs. Present general practice governing selection of machinery for various heads.

Italy. Hydroelectric Plants of the Breda Company in the Lys Valley (Gli impianti della S. I. P. Breda in Valle Lys). Elettrotecnica, vol. 10, nos. 33 and 34, Nov. 25 and Dec. 5, 1923, pp. 790–800 and 813–823, 50 figs. Description of the four projects of the company, with special attention to Pont S. Martin plant, comprising two 14,000-hp. Pelton wheels operating under a head of 1700 ft.

San Francisco, Cal. San Francisco's Hetch Hetchy Water Supply and Power Development, M. M. O'Shaughnessy. Gen. Elec. Rev., vol. 27, no. 2, Feb. 1924, pp. 78–84, 10 figs. Describes development as a whole and explains San Francisco water situation; features of hydroelectric development; describes dam to be known as O'Shaughnessy Dam which, when completed, will be highest in world.

HYDROELECTRIC PLANTS

Assembling Hydraulic Units. Assembling Heavy Hydraulic Units in Plant at Bombay. Eng. News-Rec., vol. 92, no. 8, Feb. 21, 1924, pp. 328–329, 2 figs.

Manufactured by Advertisers — CLASSIFIED LIST OF MECHANICAL EQUIPMENT — Alphabetical List on page 150

* Taylor Instrument Cos.
* Uehling Instrument Co.
* Westinghouse Electric & Mfg. Co.

Instruments, Scientific
* Taylor Instrument Cos.
Weber, F. Co. (Inc.)

Instruments, Surveying
Dietzgen, Eugene Co.
Electro Sun Co. (Inc.)
Keuffel & Esser Co.
New York Blue Print Paper Co.
ParVell Laboratories
U. S. Blue Co.
Weber, F. Co. (Inc.)

Insulating Materials (Electrical)
* General Electric Co.
Johns-Manville (Inc.)

Insulating Materials (Heat and Cold)
* Celite Products Co.
Johns-Manville (Inc.)
* King Refractories Co. (Inc.)
* Quigley Furnace Specialties Co.

Insulation, Boiler
Carey, Philip Co.

Insulation, Heat
Carey, Philip Co.

Irrigation Systems
* Spray Engineering Co.

Joints, Expansion
* Crane Co.
* Croll-Reynolds Engineering Co.
Hamilton Copper & Brass Works
Lunkenheimer Co.
* Pittsburgh Valve, Fdry. & Const. Co.
* United States Rubber Co.
* Wheeler, C. H. Mfg. Co.

Joints, Flanged Pipe
* Crane Co.
* Pittsburgh Valve, Fdry. & Const. Co.

Joints, Flexible
* Barco Mfg. Co.

Joints, Swing and Swive
* Barco Mfg. Co.
Lunkenheimer Co.

Kettles, Soda
Manufacturing Equipment & Engrg. Co.

Kettles, Steam Jacketed
* Cole, R. D. Mfg. Co.
* Nordberg Mfg. Co.
* Titusville Iron Works Co.

Keys, Machine
* Smith & Serrell
* Whitney Mfg. Co.

Keyseating Machines
* Whitney Mfg. Co.

Kilns, Dry (Brick, Lumber, Stone, etc.)
* American Blower Co.
* Sturtevant, B. F. Co.

Ladles
Northern Engineering Works
* Whiting Corp'n

Lamps, Incandescent
* General Electric Co.
Johns-Manville (Inc.)
* Westinghouse Electric & Mfg. Co.

Land-Clearing Machinery
Clyde Iron Works Sales Co.

Lathes, Automatic
* Jones & Lamson Machine Co.

Lathes, Brass
* Warner & Swasey Co.

Lathes, Chucking
* Jones & Lamson Machine Co.

Lathes, Engine
* Builders Iron Foundry

Lathes, Turret
* Jones & Lamson Machine Co.
* Warner & Swasey Co.

Levers, Flexible (Wire)
* Gwilliam Co.

Lighting Equipment
* Westinghouse Elect. & Mfg. Co

Linings, Brake
Johns-Manville (Inc.)

Linings, Furnace
* Celite Products Co.
Johns-Manville (Inc.)
* King Refractories Co. (Inc.)
* McLeod & Henry Co.
* Quigley Furnace Specialties Co.

Linings, Stack
Johns-Manville (Inc.)

Loaders, Portable
* Gifford-Wood Co.
Link-Belt Co.

Lockers, Metal
Manufacturing Equip. & Engrg. Co.

Locomotives, Electric
* General Electric Co.
* Westinghouse Electric & Mfg. Co.

Locomotives, Storage Battery
* General Electric Co.
* Westinghouse Electric & Mfg. Co.

Logging Machinery
Clyde Iron Works Sales Co.
Lidgerwood Mfg. Co.

Looms
Fletcher Works

Lubricants
* Dixon, Joseph Crucible Co.
* Royersford Fdry. & Mach. Co.
Vacuum Oil Co.

Lubricating Systems
* Bowser, S. F. & Co. (Inc.)
Lunkenheimer Co.

Lubricators, Cylinder
* Bowser, S. F. & Co. (Inc.)
Lunkenheimer Co

Lubricators, Force-Feed
* Bowser, S. F. & Co. (Inc.)
Lunkenheimer Co.

Lubricators, Hydrostatic
* Crosby Steam Gage & Valve Co.
Lunkenheimer Co.

Lubricators (Sight Feed)
* Crosby Steam Gage & Valve Co.
Lunkenheimer Co.

Machine Tool Feed Control Systems (Oil Pressure)
* American Fluid Motors Co.

Machine Work
* American Machine & Foundry Co.
* Brown, A. & F. Co.
* Builders Iron Foundry
DuPont Engineering Co.
Farrel Foundry & Machine Co.
* Franklin Machine Co.
Johnson, Carlyle Machine Co.
* Jones, W. A. Fdry. & Mach. Co.
Lammert & Mann Co.
Link-Belt Co.
* Nordberg Mfg. Co.

Machinery
(Is classified under the headings descriptive of character thereof)

Manometers
Bacharach Industrial Instrument Co.
* Simplex Valve & Meter Co.

Mechanical Draft Apparatus
* American Blower Co.
* Clarage Fan Co.
* Coppus Engineering Corp'n
* Green Fuel Economizer Co.
* Sturtevant, B. F. Co.

Mechanical Stokers
(See Stokers)

Metal Treating
* American Metal Treatment Co.

Metals, Perforated
* Hendrick Mfg. Co.

Meters, Air and Gas
Bacharach Industrial Instrument Co.
* Bailey Meter Co.
* Builders Iron Foundry
* General Electric Co.

Meters, Boiler Performance
* Bailey Meter Co.

Meters, Condensation
* Simplex Valve & Meter Co.

Meters, Electric
* General Electric Co.
* Westinghouse Electric & Mfg. Co.

Meters, Feed Water
* Bailey Meter Co.
* Builders Iron Foundry
* General Electric Co.
* H. S. B. W.-Cochrane Corp'n
Hoppes Mfg. Co.
* Simplex Valve & Meter Co.
* Worthington Pump & Machinery Corp'n

Meters, Flow
Bacharach Industrial Instrument Co.
* Bailey Meter Co.
* General Electric Co.
* H. S. B. W.-Cochrane Corp'n
* Simplex Valve & Meter Co.
* Spray Engineering Co.

Meters, Oil
* Bowser, S. F. & Co. (Inc.)
* General Electric Co.
* H. S. B. W.-Cochrane Corp'n
* Simplex Valve & Meter Co.
* Worthington Pump & Machinery Corp'n

Meters, Pitot Tube
* American Blower Co.
* Simplex Valve & Meter Co.

Meters, Steam
* Bailey Meter Co.
* Builders Iron Foundry
* General Electric Co.
* H. S. B. W.-Cochrane Corp'n

Meters, V-Notch
* Bailey Meter Co.
* General Electric Co.
* H. S. B. W.-Cochrane Corp'n

Meters, Venturi
* Builders Iron Foundry
* National Meter Co.
* Simplex Valve & Meter Co.

Meters, Water
* General Electric Co.
* H. S. B. W.-Cochrane Corp'n
Hoppes Mfg. Co.
* National Meter Co.
* Simplex Valve & Meter Co.
* Worthington Pump & Machinery Corp'n

Milling Machines, Hand
* Whitney Mfg. Co.

Milling Machines, Keyseat
* Whitney Mfg. Co.

Milling Machines, Plain
* Warner & Swasey Co.

Mills, Ball
* Allis-Chalmers Mfg. Co.
* Smidth, F. L. & Co.
* Worthington Pump & Machinery Corp'n

Mills, Blooming and Slabbing
Mackintosh-Hemphill Co.

Mills, Grinding
Farrel Foundry & Machine Co.
* Smidth, F. L. & Co.

Mills, Sheet and Plate
Mackintosh-Hemphill Co

Mills, Structural, Rail and Bar
Mackintosh-Hemphill Co.

Mills, Tube
* Allis-Chalmers Mfg. Co.
* Smidth, F. L. & Co.
* Worthington Pump & Machinery Corp'n

Mining Machinery
* Allis-Chalmers Mfg. Co.
* General Electric Co.
* Ingersoll-Rand Co.
* Worthington Pump & Machinery Corp'n

Monel Metal
Driver-Harris Co.

Monorail Systems
(See Tramrail Systems, Overhead)

Motor-Generators
* Allis-Chalmers Mfg. Co.
* General Electric Co.
Ridgway Dynamo & Engine Co.
* Westinghouse Electric & Mfg. Co.

Motors, Electric
* Engberg's Electric & Mech. Wks.
* General Electric Co.
Master Electric Co.
* Sturtevant, B. F. Co.
* Westinghouse Electric & Mfg. Co.

Motors, Synchronous
Ridgway Dynamo & Engine Co.

Nickel, Sheet
Driver-Harris Co.

Nipple Threading Machines
* Landis Machine Co. (Inc.)

Nitrogen Gas
* Linde Air Products Co.

Nozzles, Aerating
* Spray Engineering Co.

Nozzles, Blast
* Schutte & Koerting Co.

Nozzles, Sand and Air
Lunkenheimer Co.

Nozzles, Spray
* Cooling Tower Co. (Inc.)
* Schutte & Koerting Co.
* Spray Engineering Co.

Odometers
Veeder Mfg. Co.

Ohmeters
* General Electric Co.

Oil and Grease Cups
* Bowser, S. F. & Co. (Inc.)
* Crane Co.
Lunkenheimer Co.

Oil and Grease Guns
* Royersford Fdry. & Mach. Co.

Oil Burning Equipment
Bethlehem Shipbldg.Corp'n(Ltd.)
* Combustion Engineering Corp'n
* Schutte & Koerting Co.

Oil Filtering and Circulating Systems
* Bowser, S. F. & Co. (Inc.)
Nugent, Wm. W. & Co. (Inc.)

Oil Mill Machinery
* Worthington Pump & Machinery Corp'n

Oil Refinery Equipment
Bethlehem Shipbldg.Corp'n(Ltd.)
* Vogt, Henry Machine Co.

Oil Storage and Distributing Systems
* Bowser, S. F. & Co. (Inc.)

Oil Well Machinery
* Brownell Co.
* Ingersoll-Rand Co.
* Titusville Iron Works Co.
* Worthington Pump & Machinery Corp'n

Oiling Devices
* Bowser, S. F. & Co. (Inc.)
Lunkenheimer Co.
Nugent, Wm. W. & Co. (Inc.)

Oiling Systems
* Bowser, S. F. & Co. (Inc.)
Lunkenheimer Co.
Nugent, Wm. W. & Co. (Inc.)

Oils, Lubricating
Vacuum Oil Co.

Ore Handling Machinery
* Brown Hoisting Machinery Co.
Chain Belt Co.
Link-Belt Co.

Ovens, Core
* Whiting Corporation

Oxy-Acetylene Supplies
* Linde Air Products Co.

Oxygen Gas
* Linde Air Products Co.

Packing, Ammonia
Garlock Packing Co.
* Goodrich, B. F. Rubber Co.
* United States Rubber Co.

Packing, Asbestos
Garlock Packing Co.
* Goodrich, B. F. Rubber Co.
Johns-Manville (Inc.)

Packing, Centrifugal Pump
Garlock Packing Co.

Packing, Hydraulic
Garlock Packing Co.
* Goodrich, B. F. Rubber Co.
Johns-Manville (Inc.)

Packing, Metallic
Garlock Packing Co.
Johns-Manville (Inc.)

Packing, Rod (Piston and Valve)
Garlock Packing Co.
* Goodrich, B. F. Rubber Co.
* Jenkins Bros.
Johns-Manville (Inc.)
* United States Rubber Co.

Packing, Rubber
Garlock Packing Co.
* Goodrich, B. F. Rubber Co.
* Jenkins Bros.
Johns-Manville (Inc.)
* United States Rubber Co.

Packing, Sheet
Garlock Packing Co.
* Goodrich, B. F. Rubber Co.
* Jenkins Bros.
Johns-Manville (Inc.)
* United States Rubber Co.

*Catalogue data of firms marked * appear in the A.S.M.E. Condensed Catalogues of Mechanical Equipment, 1923-24 Volume*

Rotors and runners of six 10,000-kva. generating units shrunk on shafts with aid of only native labor.

British Columbia. Hydro-Electric Plant, Pacific Mills, Ltd., G. S. Barry. Can. Engr., vol. 46, no. 4, Jan. 22, 1924, pp. 161–162, 3 figs. New unit installed in pulp and paper mill at Ocean Falls, B. C., increases output to 15,000 hp.; consists of a 6300-hp. Pelton wheel direct-connected to a Can. Gen. Elec. generator with exciter.

California. Big Creek-San Joaquin Hydroelectric Project, Claude C. Brown. Power Plant Eng., vol. 28, no. 3, Feb. 1, 1924, pp. 167–172, 14 figs. Big Creek No. 3 plant, known as The Electric Giant, has three turbine units and develops total capacity of 105,000 hp. under head of 760 ft.

Largest Hydroelectric Plant in the West Placed in Service. Eng. World, vol. 24, no. 1, Jan. 1924, pp. 19–21, 6 figs. Details of Big Creek No. 3 power plant.

Wisconsin. Completing the Jim Falls Hydro-Electric Development, A. J. Hammond. Eng. News-Rec., vol. 92, no. 7, Feb. 14, 1924, pp. 270–272, 6 figs. Time element a controlling feature; method of combating northern winter conditions; importance of careful preliminary studies.

I

ICE PLANTS

Improvements. Improvements in Ice Plants, R. C. Doremus. Refrig. World, vol. 59, no. 1, Jan. 1924, pp. 17–20. Some of the more recent changes in practice and equipment which have simplified operation and increased efficiency. Paper read at N. A. P. R. E. Convention. See also Ice & Refrigeration, vol. 66, no. 1, Jan. 1924, pp. 35–39.

INDICATORS

Internal-Combustion Engines. Low Speed Indicator Developed for High Speed Engines. Automotive Industries, vol. 50, no. 6, Feb. 7, 1923, pp. 298–299, 3 figs. Device invented by Budapest scientist traces diagram which is representative of large number of succeeding cycles in power plant; influence of sources of error is greatly reduced; device known as Juhasz indicator has been placed on market by Lehmann & Michels of Hamburg, Germany.

INDUSTRIAL MANAGEMENT

Cost Control by Budget. Control through Organization and Budgets, Thos. B. Fordham and Ed. H. Tingley. Mgt. & Administration, vol. 7, nos. 1 and 2, Jan. and Feb. 1924, pp. 57–62 and 205–208. Jan.: Compilation of budget. Feb.: Applying budget to industrial operations.

Cost Information for Department Heads. Supplying Financial and Cost Information, G. M. Pelton. Mgt. & Administration, vol. 7, no. 2, Feb. 1924, pp. 169–172. Discusses how and to what extent department heads should be supplied with financial and cost information.

Executives' Clubs. A Comprehensive Plan for Executives' Clubs, S. Van T. Jester. Ry. Mech. Engr., vol. 98, no. 2, Feb. 1924, pp. 79–80. Outline of principles involved and methods followed in Jester plan.

Maintenance Work. Analysis of Work and Responsibilities of Maintenance Engineers, D. H. Braymer. Indus. Engr., vol. 82, no. 1, Jan. 1924, pp. 10–16, 8 figs. Discusses scope of maintenance work, with comments by readers on most effective methods of organizations, division of work and assignment of duties.

Raw-Material Control. Extreme Variety Versus Standardization, J. H. Van Deventer. Indus. Mgt. (N. Y.), vol. 67, no. 2, Feb. 1924, pp. 81–88, 15 figs. Raw-material ordering routine at Schenectady plant of Gen. Elec. Co.

Simplification. Just How Far Does It Pay to Go with Simplification? F. H. Montgomery. Factory, vol. 32, no. 2, Feb. 1924, pp. 153–156 and 260, 3 figs. President of Knox Hat Co. tells how plan of simplification was carried out in manufacture of soft hats.

Superintendents, Elimination of. Work without Superintendents, H. R. Simonds. Iron Trade Rev., vol. 74, no. 8, Feb. 21, 1924, pp. 548–550, 3 figs. 52 foremen of Massachusetts plant, employing 3000, are responsible only to general manager; experiment with simplified system proves successful.

Tool-Crib System. A Tool-crib System, M. L. O'Flaherty. Machy. (N. Y.), vol. 30, no. 6, Feb. 1924, pp. 428–430, 5 figs. Proper tool-crib equipment; total classification; checking out tools for production work.

INDUSTRIAL PLANTS

Maintenance. Modern Maintenance of Plant and Equipment, Wm. G. Ziegler. Indus. Mgt. (N. Y.), vol. 67, no. 2, Feb. 1924, pp. 99–105, 6 figs. The plant plumber, pipefitter and tinsmith, and what they mean to production.

INDUSTRIAL RELATIONS

Intra-Plant Relationships. Intra-Plant Relationships and Industrial Leadership, R. H. Booth. Min. & Metallurgy, vol. 5, no. 206, Feb. 1924, pp. 67–71, 4 figs. Describes novel plan for objective presentation of business economics.

Kansas City Rys. Plans. Building Good Employee Relations in Kansas City. Elec. Ry. Jl., vol. 63, no. 2, Jan. 12, 1924, pp. 63–66, 3 figs. Principles and organization plant of employee brotherhood and representation plan which have contributed to present favorable situation in Kansas City; separate committee handles all wage matters; membership in brotherhood entirely voluntary.

Progress in. Progress in Industrial Relations, Chas. M. Mills. Iron Age, vol. 113, no. 4, Jan. 24, 1924, pp. 281–283. Important gains made by progressive corporations; employee representation, it is claimed, has accomplished much, but has not been perfected.

INDUSTRIAL TRUCKS

Electric. American Electric Truck Specifications. Motor Transport (N. Y.), vol. 29, no. 12, Jan. 15, 1924, pp. 418–419. Specifications of different makes.

Studies Savings Effected by Trucks. Iron Trade Rev., vol. 74, no. 7, Feb. 14, 1924, pp. 479–481, 4 figs. Possibilities of storage-battery truck service in foundry field investigated by company manufacturing storage-battery trucks.

INJECTORS

Thermal Efficiency. The Thermal Efficiency of an Injector. Sibley Jl. of Eng., vol. 38, no. 1, Jan. 1924, pp. 13–15. Determination of this efficiency.

INSULATION, HEAT

Diatomaceous-Earth Brick. The Manufacture of an Insulating Brick From Diatomaceous Earth, C. A. Smith. Am. Ceramic Soc.—Jl., vol. 7, no. 1, Jan. 1924, pp. 52–60, 9 figs. Pulverized diatomaceous earth was blended with each of the four clays, Tennessee ball, Redford shale, Rock Hill, Tionesta, in percentages of 0, 5, 10, 15, 20, 30, 50 clay; dry pressed briquettes were made using 50 to 60 per cent water, and were burned at cones 06, 02, and 2; heat conductivity tests made upon best bodies of series.

INSURANCE

Social. Workmen's Compensation and Social Insurance. Monthly Labor Rev., vol. 18, no. 1, Jan. 1924, pp. 157–161. Group-insurance plan of So. Pac. Co.; Franco-Belgian and Franco-Luxemburg conventions relating to social insurance.

INTERNAL-COMBUSTION ENGINES

Radiation Characteristics. Radiation Characteristics of the Internal-Combustion Engine, Thos. Midgley, Jr. and H. H. McCarty. Soc. Automotive Engrs.—Jl., vol. 14, no. 2, Feb. 1924, pp. 182–185, 7 figs. Presents data showing how radiation varies with changes in character of combustion; it is concluded that radiation produced during internal combustion is function of chemical reaction involved to much greater extent than are merely temperatures of gases, although these play a marked part.

[See also AIRPLANE ENGINES, AUTOMOBILE ENGINES; DIESEL ENGINES; GAS ENGINES; GASOLINE ENGINES; OIL ENGINES.]

IRON AND STEEL

Bibliography 1923. Review of Iron and Steel Literature for 1923, E. H. McClelland. Forging—Stamping—Heat Treating, vol. 10, no. 1, Jan. 1924, pp. 5–9. Classified list of more important books, serials and trade publications during year, with few of earlier date, not previously announced.

Pacific Coast, U. S. Iron and Steel on the Pacific Coast, C. E. Williams. Min. & Metallurgy, vol. 5, no. 205, Jan. 1924, pp. 23–25. Local demand and production; foreign pig iron being imported in preference to eastern United States products; raw-materials supply; smelting methods; sponge iron.

Terminology. Iron and Steel Terminology, H. D. Hibbard. Min. & Metallurgy, vol. 5, no. 206, Feb. 1924, pp. 77–78. Clarifies use of terms often occurring in writings on iron and steel, and suggests several new short abbreviated names for some of the things related to subject which now are indicated by phrases.

Trade of Great Britain. The Iron and Steel Trade in 1923. Iron & Coal Trades Rev., vol. 108, no. 2914, Jan. 4, 1924, pp. 8–17, 2 figs. District reviews, including pig-iron production, prices, iron ore, manufactured iron and steel, imports and exports, wages, by-product market, etc.

IRON CASTINGS

Reinforced, for Cylinders. Reinforced Gray Iron Castings (La fonte armée). Fonderie Moderne, vol. 18, Jan. 1924, p. 16, 1 fig. Describes process employed for manufacture of automobile-engine cylinders by Belgian foundry; all parts of cylinder where porosity is frequent are provided with thin steel wall which welds closely to iron and ensures perfect tightness; by use of this method it becomes possible to cast cylinders in soft graphitic irons; same method has been employed for making high-pressure gas and liquid containers.

IRON FOUNDING

Metallurgy. History of Foundry Metallurgy. Metal Industry (Lond.), vol. 24, no. 4, Jan. 25, 1924, pp. 83–84. Traces development of basis of modern iron-foundry metallurgy, leading up to present-day opinions as to grading of pig irons.

Problems. Some Foundry Problems, A. H. Mundey. Foundry Trade Jl., vol. 29, no. 387, Jan. 17, 1924, pp. 58–61 and (discussion) 61–62. Deals with melting problems, non-ferrous alloys, heat treatment of gun metal, die-casting, bell and brass founding, mold facings, high-tensile brasses, beta brass, etc. Paper read before Lond. branches of Inst. British Foundrymen and Inst. Metals.

Thermit, Application of. Application of Thermit in Foundry Practice. West. Machy. World, vol. 15, no. 1, Jan. 1924, pp. 29–30, 1 fig. For increasing temperature of iron and steel, and making semi-steel in ladle; use in riser; titanium thermit cans for purifying iron and steel; method of making steel castings by thermit process.

IRON METALLURGY

Manufacture of Pure Iron. Commercially Pure Iron. Gas Engr., vol. 40, no. 573, Jan. 1924, pp. 4–5, 2 figs. Purification of ingot iron; danger of fracture, and resistance to corrosion.

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LABOR

Bibliography. Publications Relating to Labor. Monthly Labor Rev., vol. 18, no. 1, Jan. 1924, pp. 206–215. List of official and unofficial publications in United States and foreign countries.

LABOR TURNOVER

Absentism. Absentism Factors for Industrial Plants, J. D. Hackett. Mgt. & Administration, vol. 7, no. 2, Feb. 1924, pp. 199–203. Relative importance of absence; nature, calculation and extent of absence; absence and wages; prevention of absence; remedies.

Reducing. Reducing the Turnover of Labor, C. A. Walker. Iron Trade Rev., vol. 74, no. 5, Jan. 31, 1924, pp. 350–352, 4 figs. Suitable records afford basis for study of causes of labor turnover.

LATHES

Gap. The Buckman 8½-inch Center Lathe. Machy. (Lond.), vol. 23, no. 590, Jan. 17, 1924, pp. 511–512, 3 figs. Distinguishing feature of hollow-spindle, gap-bed lathe is novel construction of bed.

LIGHTING

Equipment Depreciation. Depreciation of Lighting Equipment due to Dust and Dirt, E. A. Anderson and J. M. Ketch. Illuminating Eng.—Trans., vol. 19, no. 1, Jan. 1924, pp. 55–65 and (discussion) 65–86. Report of tests under service conditions to determine relative depreciation or loss in efficiency. Possibilities of a simple comparison standard for predicting depreciation rates in a particular installation.

Methods. Modern Methods of Artificial Illumination, A. L. Powell. Am. Architect, vol. 125, no. 2438, Jan. 30, 1924, pp. 133–139, 8 figs. Desirable qualities of an illuminant, desirable qualities of illumination, and discussion of standard types of equipments which have diversified applications for different classes of service.

Nomenclature and Standards. Recent Developments in Nomenclature and Standards. Illuminating Eng. Soc.—Trans., vol. 19, no. 1, Jan. 1924, pp. 7–16. Progress made during 1923 in revision of Illuminating Engineering Nomenclature and Photometric Standards previously prepared by I. E. S. committee and approved as American Standard by Am. Eng. Standards Committee. Presents questions for consideration on which it is desired to have discussion and advice, among which are definition of "light" and "lighting," matter of "brightness" and units to be used in measuring it, and use of term "luminaire."

Problems. Working with the Architect on Difficult Lighting Problems, A. D. Curtis and J. L. Stair. Illuminating Eng. Soc.—Trans., vol. 19, no. 1, Jan. 1924, pp. 43–54 and (discussion) 65–86, 15 figs. Emphasizes necessity for early consultation between architect and lighting man in planning of lighting features of a building as well as responsibility of lighting man in developing in himself an appreciation of architectural values so as to most intelligently work with his architectural colleague. Gives some specific examples of lighting problems to illustrate advantages to be derived by considering lighting as a component part of structure.

Progress. Progress in the Art of Illumination, A. Bishoff. Illuminating Eng. Soc.—Trans., vol. 19, no. 1, Jan. 1924, pp. 17–27. Progress made from Jan. 1, 1900 to July 31, 1923, as evidenced by number of patents granted by U. S. Patent Office. Brief discussion of more active branches is given to indicate trend of thought followed by inventors.

Textile Mills. Developments in Mill Lighting, R. A. Palmer. Textile World, vol. 65, no. 5, Feb. 2, 1924, pp. 419–420, 4 figs. Studies show importance of speed of vision in manufacturing operations; higher intensities being employed; effect on production and accidents; development in suspension of units which facilitates maintenance of lighting equipment.

LOCOMOTIVES

Development. A Quarter Century of the Steam Locomotive, W. A. Austin. Ry. Rev., vol. 74, no. 2, Jan. 12, 1924, pp. 107–114, 24 figs. History of growth and development of the various types since introduction of first American Mogul and Atlantic types. Paper read before Pa. section of A.S.M.E.

Diesel-Engined. The Next Step is the "Thermo-Locomotive," J. Barraja-Frauenfelder. Ry. Mech. Engr., vol. 98, no. 2, Feb. 1924, pp. 81–85, 1 fig. Application of Diesel engine to railway work; the Sulzer thermo-locomotive.

4-8-2. Heavy 4-8-2 Type Southern Pacific Locomotives. Ry. Age, vol. 76, no. 6, Feb. 9, 1924, pp. 375–377, 3 figs. Designed to haul 12 passenger cars on 2-per cent grades and run 815 mi. See also Ry. Rev., vol. 74, no. 6, Feb. 9, 1924, pp. 250–256, 6 figs.

High Pressures and Superheated Steam. Theoretical Savings Effected by Using High Pressures and Super-Heated Steam. Ry. & Locomotive Eng., vol. 37, no. 1, Jan. 1924, pp. 12–13, 1 fig. Analysis of heat required to produce various steam pressures and temperatures of superheat. Chart giving comparison of B.t.u. values of characteristics of saturated and superheated steam at different pressures and temperatures.

Internal-Combustion. The "Still" System Internal Combustion Locomotive. Ry. & Locomotive Eng., vol. 37, no. 1, Jan. 1924, pp. 14–15. Notes on new development by Still Engine Co.; 2-6-2 type.

Long Runs. Long Locomotive Runs on the Norfolk & Western Ry. Ry. Rev., vol. 74, no. 5, Feb. 2, 1924, pp. 203–207, 8 figs. Account of experience in developing practice of locomotive runs in passenger service over multiple divisions; special reference is made to type of locomotive which made these runs

Manufactured by Advertisers — CLASSIFIED LIST OF MECHANICAL EQUIPMENT — Alphabetical List on page 150

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* Wheeler Cond. & Engrg. Co.
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Punches, Power
* Niagara Machine & Tool Works
* Royersford Fdry. & Mach. Co.

*Catalogue data of firms marked * appear in the A.S.M.E. Condensed Catalogues of Mechanical Equipment, 1923-24 Volume*

possible, and details are given of construction of tenders whose increased capacity was essential feature.

Mikado. Mikado Type Locomotive, Canadian National Rys. Ry. Rev., vol. 74, no. 1, Jan. 5, 1924, pp. 12–16, 7 figs. Description of 45 engines designed largely to Can. Nat. standards especially for conditions in western Canada; cylinders 27 in. by 30 in. diam. driving wheels 63 in. diam.; boiler pressure 185 lb.; tractive power 54,600 lb. without booster and 65,000 lb. with.

Tire-Flange Welding. Welding Locomotive Tires. Ry. & Locomotive Eng., vol. 37, no. 1, Jan. 1924, pp. 21–23, 7 figs. Details of investigation made to determine effect on strength of material produced by local heating when building up worn tire flanges by either gas or electric process of welding.

2-10-2. Heavy Santa Fe Locomotives for B. & O. Ry. Age, vol. 76, no. 7, Feb. 16, 1924, pp. 413–414, 2 figs. Tractive force of 84,260 lb. obtained with 64-in. drivers; tenders of unusual capacity facilitate long runs.

Heavy 2-10-2 Type Locomotives for Baltimore and Ohio. Railroad Herald, vol. 28, no. 2, Jan. 1924, pp. 20–21, 1 fig. Cylinders 30 by 32 in.; driving wheels 58 in. diam.; tractive effort 84,260 lb. See also Ry. & Locomotive Eng., vol. 37, no. 1, Jan. 1924, pp. 19–20, 1 fig.; and Ry. Mech. Engr., vol. 98, no. 2, Feb. 1924, pp. 73–76, 4 figs.

Types Built in 1923. Locomotives. Ry. Rev., vol. 74, no. 1, Jan. 5, 1924, pp. 52–63, 30 figs. Types ordered by Class I railroads in 1923, and principal dimensions and illustrations of representative types.

Velocity Profiles. The Preparation and Use of Velocity Profiles, V. I. Smart. Ry. Rev., vol. 74, no. 5, Feb. 2, 1924, pp. 209–215, 7 figs. Tractive effort, coal consumption, and running time may be obtained graphically from velocity profiles, prepared in accordance with principles laid down by Am. Ry. Eng. Assn.

LUBRICATING OILS

Steam-Turbine. Maintaining Quality of Steam Turbine Oils in Service, C. H. Bromley. Power, vol. 59, no. 4, Jan. 22, 1924, pp. 125–128, 6 figs. Principal factors in recent development of information and equipment as related to maintaining quality of lubricating oils in use in steam turbines.

LUBRICATION

Journal. A Graphical Study of Journal Lubrication, H. A. S. Howarth. Mech. Eng., vol. 46, no. 2, Feb. 1924, pp. 77–79 and (discussion) 79–80, 10 figs. Visualizes characteristics of oil film and pressures within it for journal completely surrounded by its bearing; influences of clearance and viscosity upon journal friction are quantitatively shown by means of chart that can readily be used for designing bearings. (Abridged.)

Tools. Tool Engineering, A. A. Dowd and F. W. Curtis. Am. Mach. vol. 60, no. 4, Jan. 24, 1924, pp. 135–137, 3 figs. Use and importance of cutting lubricants; proper application of coolant to tool and work; lubricating milling cuts; value of lubricants in thread cutting.

M

MACHINE SHOPS

Ford Motor Co., Canada. New Machine Shop for Ford Motor Co. Can. Engr., vol. 46, no. 7, Feb. 12, 1924, pp. 223–225, 3 figs. Covers 15 acres and is 1088 ft. by 570 ft. wide; a one-story sawtooth monitor type of building with a clear height under trusses of 14 ft. and with two longitudinal and one cross craneways.

MACHINE TOOLS

Cone-Pulley Drives. The Design of Cone Pulley Drives, S. Odegaard. Am. Mach., vol. 60, no. 7, Feb. 14, 1924, pp. 245–247, 1 fig. Useful tables for quick computation; design of back gearing; belt width and horsepower; design of drive for 24-in. lathe as example.

Defects in. Some Suggestions for Builders and Users of Machine Tools. Thos. Nadin. Soc. Automotive Engrs.—Jl., vol. 14, no. 2, Feb. 1924, pp. 134–135. Points out simple and obvious defects in many present-day production machine tools and offers constructive suggestions for their elimination.

Plate and Bar-Working. Plate and Bar-working Tools. Machy. (Lond.), vol. 23, no. 588, Jan. 3, 1924, pp. 450–454, 9 figs. Plate edge planers; frame plate slotting and milling machines.

Safety Tapping Mechanisms. Mechanisms for Preventing Tap Breakage, A. Pestel. Machy. (N. Y.), vol. 30, no. 6, Feb. 1924, pp. 424–426, 6 figs. Deals with more important problems involved in designing safety tapping mechanisms, and methods suggested for overcoming difficulties encountered with certain mechanisms developed for this work.

MACHINERY

Czechoslovakian Industry. The Cost of Nationalism in Czecho-Slovakia, H. Obermeyer and A. L. Greene. Am. Mach., vol. 60, no. 8, Feb. 21, 1924, pp. 291–294, 3 figs. Present condition of machine industry; results of economic policy; discrimination in favor of Czech industrials; domestic field in machinery.

Guards for. Construction of Machinery Guards. Nat. Safety News, vol. 9, no. 1, Jan. 1924, pp. 43–53, 14 figs. Materials suitable for guard construction; machine tools needed for fabrication of guards; detailed guard features; specifications for guards; guard standards.

MAGNESIUM

Foundry Practice. Explains Use of Magnesium, H. J. Maybrey. Foundry, vol. 52, no. 3, Feb. 1, 1924, pp. 96–99, 3 figs. Peculiarities of metal which readily can be handled by foundryman are pointed out; features of molding and design, and means of avoiding defective castings. Paper presented at Int. Foundrymen's Congress.

MANUFACTURING

Simplification. Economic Progress of Simplification, E. W. McCullough. Iron Age, vol. 113, no. 4, Jan. 24, 1924, pp. 285–287. More than five-sixths of number of varieties formerly used have been eliminated in some industries; help of trade associations.

MATERIALS

Limit of Elasticity. The Static and Dynamic Elastic Limit in Material Testing and Construction (Die statische und dynamische Elastizitätsgrenze im Marerialprüfungs- und Konstruktionswesen), G. Welter. Zeit. des Vereines deutscher Ingenieure, vol. 68, no. 1, Jan. 5, 1924, pp. 9–11, 3 figs. Points out necessity for reform in material-testing practice and makes plea for detailed investigation of statically and dynamically true limit of elasticity of all structural materials, in order to keep pace with requirements of modern machinery construction.

MATERIALS HANDLING

Automobile Plants. Flexibility in Handling Production Material, A. A. Brown. Soc. Automotive Engrs.—Jl., vol. 14, no. 2, Feb. 1924, pp. 148–150. Routing and handling materials through receiving department; stocking of materials; service-department requirements; shortage report and its significance; stock records.

Material Handling is Cut to Minimum in Jewett Assembly Plant, W. L. Carver. Automotive Industries, vol. 50, no. 6, Feb. 7, 1924, pp. 281–288, 10 figs. Facilities for straight-line material flow and elimination of burdensome handling incorporated in new assembling plant of Paige-Detroit Motor Car Co.

Factories. Receiving, Storing and Issuing Factory Material, P. M. Atkins. Indus. Mgt. (N. Y.), vol. 67, no. 2, Feb. 1924, pp. 120–126, 9 figs. Explains fundamentals which govern working out of practical system for any given set of conditions.

METALS

Cold Working. Effect of Severe Cold Working on Scratch and Brinell Hardness, H. S. Rawdon and W. H. Mutchler. Am. Inst. Min. & Met. Engrs.—Trans., No. 1291-N, Jan. 1924, 11 pp., 7 figs., also (abstract) Min. & Metallurgy, vol. 5, no. 205, Jan. 1924, p. 31. Results obtained when a series of metals, copper, iron, tin, etc., were cold rolled to a definite degree without any intermediate annealing and hardness determined by both scratch and Brinell methods.

Failure. Premature Failure of Metal Parts While in Use and Methods of Prevention (Le roturre accidentali dei materiali metallici in opera ed il modo di prevenirle), P. Forcella. Elettrotecnica, vol. 10, no. 28, Oct. 5, 1923, pp. 672–676, 37 figs. Deals with failures due to violent shock, forces greater than calculated, excessive use, heating to unusual temperatures, etc.

Strength. Cross-Relations of Strengths of Metals in Tension, Compression, Torsion and Transverse Loading, G. B. Upton. Sibley Jl. of Eng., vol. 38, no. 1, Jan. 1924, pp. 2–6, 2 figs. Underlying relationships of strengths of materials under various kinds of loading; proper criteria of failure to apply to different kinds of metal in different places; reasons why specification of tension properties of a metal has been and will continue to be so satisfactory in insuring properties desired, whatever kind of loading is applied in actual structure.

Uses. New Uses for Metals. Metal Industry (N. Y.), vol. 22, nos. 1 and 2, Jan. and Feb. 1924, pp. 1–4 and 55, 3 figs. Symposium containing following articles: Researching the Field of Brass and Copper Consumption, W. A. Willis; Development of Zinc, S. S. Tuthill; New Uses of Lead and Tin, G. O. Hiers; Aluminum; New Uses and Applications of Nickel and Its Products, E. A. Turner and R. L. Suhl; Miscellaneous Metals, A. Bregman.

MICROSCOPES

Portable. Portable Microscope. Iron Age, vol. 113, no. 5, Jan. 31, 1924, p. 371, 4 figs. New type for use on metal in shop; applicable to various shapes.

MILLING MACHINES

Duplex Head. Duplex Head Milling Machine. Machy. (Lond.), vol. 23, no. 591, Jan. 24, 1924, pp. 554–555, 2 figs. Developed to meet requirements of manufacturers for either slab or face-milling operations.

Tool Fixtures. The Standardization of Tool Fixtures for Milling Machines (Die Normung der Werkzeugbefestigung an Fräsmaschinen), G. Schlesinger and K. Hegner. Werkstattstechnik, vol. 18, no. 1, Jan. 1, 1924, pp. 1–3, 9 figs. Recommendations for standardization of toolholders by standards committee of Assn. German Machine-Tool Builders.

MOLDING METHODS

Green-Sand. Green Sand Moulding, J. D. Nicholson. Foundry Trade Jl., vol. 29, no. 387, Jan. 17, 1924, pp. 54–55 and (discussion) 55–57, 8 figs. Discusses essential operations, using an Erith loam sand, and defects produced if such operations are not carried out in a definite manner.

Propellers. Sweeps a Differential Pitch, J. Edgar. Foundry, vol. 52, no. 2, Jan. 15, 1924, pp. 51–52, 7 figs. Describes characteristics peculiar to propellers in which pitch varies from that of a true screw; method employed in foundry to make mold.

MOLDING MACHINES

Brass-Foundry Practice. Molding Machine Practice, N. F. Flanagan. Metal Industry (N. Y.), vol. 22, no. 1, Jan. 1924, pp. 5–6. How molding machine is put to work in brass foundry; discusses core making, mold making, fast molding, and molding board sizes.

MOLDS

Hardness Testing Apparatus. A Hardness Testing Apparatus for Moulds and Cores, L. Treuheit. Foundry Trade Jl., vol. 29, no. 387, Jan. 17, 1924, pp. 50–51, 3 figs. Describes horizontal and vertical mold-testing devices designed similarly to Brinell testing machine to determine hardness of molds and cores in gr./mm.^{2}, to obtain a real supervision of all parts, and thereby insure clean castings with a reduction in wasters. From paper read before Hamburg Conference of German Foundrymen.

MOTOR BUSES

Body Construction. Body Construction Shows Many New Ideas, C. Gordon. Bus Transportation, vol. 3, no. 1, Jan. 1924, pp. 17–22, 17 figs. Classification into service types becoming more distinct; importance of appearance as merchandising well recognized; widespread popularity of sedan-type coach; ways to improve appearance of bodies; progress in structural details and fittings.

Chassis Developments. Refinements Mark Chassis Development, R. E. Plimpton. Bus Transportation, vol. 3, no. 1, Jan. 1924, pp. 9–14, 4 figs. Review of progress made during 1923.

Double-Deck. The Double-Deck Motor Omnibus, R. W. Meade. Soc. Automotive Engrs.—Jl., vol. 14, no. 2, Feb. 1924, pp. 209–216. London's experience with early motor buses; London motor-bus specifications, and post-war development; double-deck buses on European continent; early bus operation in New York City; expansion to other cities and improvements in equipment; controlling factors for future design.

Electric-Railway-Operated. Extent and Kind of Bus Operation by Electric Railways. Elec. Ry. Jl., vol. 63, no. 1, Jan. 5, 1924, pp. 5–13. Summary of methods, of 121 companies based on nation-wide survey of industry; feeder service i s most common form of operation; great expansion planned for 1924.

Field and Future. The Field and Future of the Motorbus, J. A. Emery. Soc. Automotive Engrs.—Jl., vol. 14, no. 2, Feb. 1924, pp. 107–110. Relation of buses to railroads on routes not served by railroads, as adjunct to railways; substitute for unprofitable railway lines

London Gen. Omnibus Co. Worm Driven Cranked Axle is Novel Feature of Latest L. G. O. Bus, M. W. Bourdon. Automotive Industries, vol. 50, no. 4, Jan. 24, 1924, pp. 184–188, 5 figs. Final reduction by internal gear and pinion running in oil; pressed steel frame has one pronounced drop back of engine and another aft of rear axle; rubber buffers used to supplement springs.

Specifications. Current Specifications of Gasoline Motor Buses. Motor Transport (N. Y.), vol. 29, no. 12, Jan. 15, 1924, pp. 416–417. Specifications of different makes.

MOTOR-TRUCK TRANSPORTATION

Freight Traffic. Utilizing the Motor Truck in Freight Traffic. Ry. Age, vol. 76, no. 5, Feb. 2, 1924, pp. 319–323, 7 figs. Contains following articles: Pennsylvania Installs 204 Miles of Motor Truck Service During 1923, R. S. Hurd; and English Store Door Delivery Practice, F. C. Horner.

MOTOR TRUCKS

Axles. Machining Sheldon Truck Axles, F. H. Colvin. Am. Mach., vol. 60, no. 8, Feb. 21, 1924, pp. 275–277, 8 figs. Some of the special machines and fixtures used in machining both front and rear axles by Sheldon Axle & Spring Co., Wilkes-Barre, Pa.

Glasgow Show. Transport Vehicles at the Scottish Show. Motor Transport (Lond.), vol. 38, no. 987, Jan. 28, 1924, pp. 104–110, 12 figs. Review of passenger and goods-carrying vehicles exhibited at Glasgow show, Jan. 25–Feb. 2, 1924.

Morris. A Morris One-Tonner. Motor Transport (Lond.), vol. 38, no. 987, Jan. 28, 1924, pp. 96–98, 5 figs. Four-cylinder engine, with 75-mm. bore and 102-mm. stroke; wheelbase 10 ft. 2 in.

Specifications. Current Specifications of Gasoline Trucks. Motor Transport (N. Y.), vol. 29, no. 12, Jan. 15, 1924, pp. 409–414. Specifications of the different makes of trucks of from ¾ tons and under to 5 tons and over.

Steam. The "Sentinel" Steam Wagon. Indus. Management (Lond.), vol. 11, no. 2, Jan. 24, 1924, pp. 51–53, 4 figs. Particulars of Super-Sentinal and the various types of bodies built for different kinds of work.

N

NICKEL STEEL

Carburization. Heat-Treatment of Steel with Special Reference to Production, J. W. Urquhart. Machy. (Lond.), vol. 23, no. 588, Jan. 3, 1924, pp. 446–449. Carburization of nickel steels.

O

OIL ENGINES

British Industry. The British Heavy-Oil Engine Industry—Record of 1923. Gas & Oil Power, vol. 19, no. 220, Jan. 3, 1924, pp. 59–60. Notes on developments in hot-bulb, high-compression, and Diesel engines.

Manufactured by Advertisers CLASSIFIED LIST OF MECHANICAL EQUIPMENT

Alphabetical List on page 150

Punches and Dies
* Royersford Fdry. & Mach. Co.

Punching and Coping Machines
* Long & Allstatter Co.

Punching and Shearing Machines
* Long & Allstatter Co.
* Royersford Fdry. & Mach. Co.

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* Superheater Co.
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Pyrometers, Optical
* Taylor Instrument Cos.

Pyrometers, Pneumatic
* Uehling Instrument Co.

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* Taylor Instrument Cos.

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* James, D. O. Mfg. Co.
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Racks, Storage, Metal
Manufacturing Equipment & Engrg. Co.

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* American Radiator Co.
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Link-Belt Co.

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* Tagliabue, C. J. Mfg. Co.
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(See Instruments, Recording)

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* Drake Non-Clinkering Furnace Block Co.
Keystone Refractories Co.
* King Refractories Co. (Inc.)
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* De La Vergne Machine Co.
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* Mason Regulator Co.

Regulators, Condensation
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* Coppus Engineering Corp'n
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* Kieley & Mueller (Inc.)
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Squires, C. E. Co.

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* Schutte & Koerting Co.

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Regulators, Hydraulic Pressure
* Foster Engineering Co.
* Mason Regulator Co.

Regulators, Liquid Level
* Tagliabue, C. J. Mfg. Co.

Regulators, Pressure
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* General Electric Co.
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* Mason Regulator Co.
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(See Governors, Pump)

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(See Counters, Revolution)

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Mackintosh-Hemphill Co.

Riveters, Pneumatic
* Ingersoll-Rand Co.

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* Long & Allstatter Co.

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(See Bearings, Roller)

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Farrel Foundry & Machine Co.
Mackintosh-Hemphill Co.
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Rolls, Crushing
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Link-Belt Co.
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Clyde, Iron Works Sales Co.
* Roebling's, John A. Sons Co.

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* Goodrich, B. F. Rubber Co.
* Jenkins Bros.
* United States Rubber Co.

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Farrel Foundry & Machine Co.

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Chain Belt Co.
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* Hendrick Mfg. Co.
Link-Belt Co.

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(See Dies, Thread Cutting)

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* Warner & Swasey Co.

Screws, Cap
* Scovill Mfg. Co.

Screws, Safety Set
Allen Mfg. Co.
* Bristol Co.

Screws, Set
Allen Mfg. Co.

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Shafting, Flexible
* Gwilliam Co.

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* McLeod & Henry Co.

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Union Drawn Steel Co.

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Shears, Plate
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(See Stacks, Steel)

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(See Wire Rope Fastenings)

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Sprays, Water
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Rockwood Sprinkler Co.

Sprinklers, Spray
* Cooling Tower Co. (Inc.)
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*Catalogue data of firms marked * appear in the A.S.M.E. Condensed Catalogues of Mechanical Equipment, 1923-24 Volume*

High-Compression. High Compression Oil Engines in Theory and Practice. Power Engr., vol. 19, nos. 214 and 215, Jan. and Feb. 1924, pp. 13–15 and 49–51, 6 figs. Jan.: Recent designs and new developments that may be expected. Feb.: Practical matters affecting erection and operation.

Hydraulic Couplings. Marine Oil Engine Gearing. Times Trade & Eng. Supp., vol. 13, no. 284, Dec. 15, 1923, p. 342, 1 fig. Describes system advocated by Vulcan Works, Hamburg, of interposing hydraulic coupling between engine and tooth reduction gearing.

Roller-Bearing Hot-Bulb. A Roller Bearing Oil Engine. Engineer, vol. 137, no. 3552, Jan. 25, 1925, pp. 92–94, 5 figs. Describes Richards hot-bulb engine, fitted with roller-type bearings throughout.

Scavenging, Upflow-Valve. Uniflow Valve Scavenging of Two-Stroke-Cycle Engines, R. Matthews. Power, vol. 59, no. 59, Feb. 5, 1924, pp. 208–209, 4 figs. Obtaining air and fuel mixing; solid injection for high speeds; external mixing.

OIL FUEL

Burners. Correct Methods of Using Fuel Oil, H. A. Anderson. Iron Age, vol. 113, no. 7, Feb. 14, 1924, pp. 518–519. Analysis of four types of oil burners, three types of furnaces and combinations of furnaces with burners. Address before Southern & Southwestern Ry. Club.

Domestic Oil Burning, L. B. French. Sheet Metal Worker, vol. 15, no. 1, Feb. 1, 1924, pp. 10–11 and 28. Future of domestic oil burner covering oil-storage facilities, automatic controls and principles of operation.

Measuring Oil Burner Steam Consumption, F. A. Rothwell. Power Plant Eng., vol. 28, no. 3, Feb. 1, 1924, pp. 175–176, 5 figs. Points out that orifice manifold for measuring steam consumption can easily be made in plant.

Efficient Utilization. Power Plant Management, Rob. June. Elec. Light & Power, vol. 2, no. 2, Feb. 1924, pp. 58, 60, 62 and 79, 2 figs. Efficient utilization of fuel oil.

Locomotive, Storage and Distribution of. Typical Layouts for Storage and Distribution of Fuel Oil, Including Fuel Oil Stations between Terminals. Am. Ry. Eng. Assn.—Bul., vol. 25, no. 260, Oct. 1923, pp. 66–95, 9 figs. Discusses unloading facilities, storage, delivery, and heating. Tabulation of replies from 14 oil-using railways to a questionnaire covering general features of design of facilities for handling, storage and delivery of fuel oil; representative layout and detail plans of such facilities.

OPTICAL INSTRUMENTS

Developments, 1923. Review of Optical Instrument Progress of the Past Year. English Mechanics, vol. 99, no. 3069, Jan. 18, 1924, pp. 8–10, 8 figs. Account of few of more typical developments of 1923.

OXY-ACETYLENE WELDING

Applications. Construction, Reclamation and Destruction. Iron & Steel of Canada, vol. 7, no. 1, Jan. 1924, pp. 13–16, 8 figs. Typical uses of oxy-acetylene torch.

Freight-Yard Repairs. Welding and Cutting in Freight Yard Repairs, H. W. L. Porth. Ry. Mech. Engr., vol. 98, no. 2, Feb. 1924, pp. 88–90, 4 figs. Parts that may be needed, procedure to be followed, precautions that should be taken; scope for cutting.

Rotary Kilns and Coolers. Largest Oxy-Acetylene Welded Equipment Ever Built, R. R. Orwig. Acetylene Jl., vol. 25, no. 7, Jan. 1924, pp. 325–328, 6 figs. Experiences in oxy-acetylene welding of 8-ft. by 125-ft. rotary kilns and 5-ft. by 50-ft. coolers, installed at plant of Union Carbide Co., by Reeves Bros. Co. of Alliance, Ohio.

OXYGEN

Liquefaction Production Process. Economical Plant for Producing Oxygen by the Liquefaction Process, A. G. Wikoff. Chem. & Met. Eng., vol. 30, no. 5, Feb. 4, 1924, pp. 181–184, 5 figs. Describes process and points out its economic advantages.

OXYGEN CYLINDERS

Manufacture. The Manufacture of "Shelby" Seamless Steel Cylinders, J. L. Smith. Acetylene Jl., vol. 25, no. 7, Jan. 1924, pp. 329–332, 9 figs. Details of "cupping" method for manufacture of oxygen cylinders, accessory of oxy-acetylene welding and cutting equipment.

Oxygen Regulators. Design and Construction of Gas Regulators, E. L. Mills. Acetylene Jl., vol. 25, no. 7, Jan. 1924, pp. 336–340, 6 figs. Deals with devices for regulating pressure and volume of gas in cylinder (as used by oxy-acetylene and oxy-hydrogen industries) up to torch.

P

PATTERNMAKING

Electrodeposition in. Making Metal Patterns by Electro-Deposition, W. J. Reardon. Metal Industry (Lond.), vol. 24, no. 3, Jan. 18, 1924, p. 55, 2 figs. Method of procedure.

PIGMENTS

Lithopone. Record of Experiments in Testing the Light-Resistance of Lithopone, H. A. Gardner and P. C. Holdt. Paint Mfrs.' Assn. of U. S.—Sci. Section, circular no. 194, Jan. 1924, pp. 174–205, 11 figs. Effect of acidity of varnish and oil.

PIPE

Strength and Stiffness Determination. Charts for Bars and Pipe in Torsion, F. Szabo. Am. Mach., vol. 60, no. 8, Feb. 21, 1924, pp. 279–282, 2 figs. Two charts making possible rapid solution of problems dealing with round bars and pipe in torsion, for determining strength and stiffness or angle of twist.

PIPE COVERINGS

Tests. Commercial Efficiency of Single and Graded Steam Pipe Coverings. Heat. & Vent. Mag., vol. 21, no. 1, Jan. 1924, pp. 48–52, 6 figs. Results of recent tests on magnesia, air cell, asbestocel, carocel, nonpareil, sponge felt and multiply types, conducted at State College of Wash. and reported in Eng. Bul. No. 12 by H. J. Dana.

PISTON RINGS

Machining. Machining Piston Rings on a Production Basis, H. P. Armson. Can. Machy., vol. 31, no. 4, Jan. 24, 1924, pp. 13–16, 3 figs. Comparison of casting methods with a description of process employed by a Toronto plant in manufacturing rings for automotive industry.

Manufacture of Special Piston Rings. West. Machy. World, vol. 15, no. 1, Jan. 1924, pp. 15–17, 9 figs. Shop methods and some of the special fixtures used by M. & H. Piston Ring Co. of Oakland, Cal., in manufacture of special rings for automobiles, trucks and tractors.

PISTONS

Machining. Machining Pistons and Other Contract Work, H. P. Armson. Can. Machy., vol. 31, no. 3, Jan. 17, 1924, pp. 17–20, 3 figs. Describes method of Allatt Machine & Tool Co., Toronto, of machining cast-iron automotive engine pistons accurately and economically; salvaging worn cams by recutting raceways for larger rollers.

PNEUMATIC TOOLS

Storage and Handling. Pneumatic Tool Service. Machy. (Lond.), vol. 23, no. 589, Jan. 10, 1924, pp. 480–483, 14 figs. Methods of storage; handing out and receiving tools.

POLISHING

Firearms. Polishing Firearm Parts. Machy. (Lond.), vol. 23, no. 591, Jan. 24, 1924, pp. 558–562, 15 figs. Notes on polishing rifle receivers, barrels, and pistol parts.

PRESSES

Inclinable Power. Design of Inclinable Power Presses, P. A. Friedell. Machy. (N. Y.), vol. 30, no. 6, Feb. 1924, pp. 442–445, 4 figs. Proportioning mechanical knockout, legs, and inclining mechanism for power press.

Manufacture. Making Power Presses for Quantity Production, H. P. Armson. Can. Machy., vol. 31, no. 5, Jan. 31, 1924, pp. 13–17, 3 figs. Description of methods employed in plant of Brown, Boggs Co., Hamilton, Can., with particular reference to inclinable type.

PRINTING MACHINES

Rolls, Drilling. Deep-Hole Drilling in Large Lathe. Iron Age, vol. 113, no. 6, Feb. 7, 1924, pp. 419–421, 7 figs. Success in drilling printing-machine rolls attributed to boring bar; describes machining of rolls; special milling attachments developed.

PRODUCER GAS

Hydrogen in. Determination of Hydrogen in Producer Gas. Fuels & Furnaces, vol. 2, no. 2, Feb. 1924, pp. 167–168. Percentage of hydrogen in gas serves as guide in successful producer operation; thermal conductivity of hydrogen used as basis for its continuous physical analysis.

PULLEYS

Machining. Machining Pulleys on a Big Production Basis, A. E. Granville. Can. Machy., vol. 31, no. 6, Feb. 7, 1924, pp. 27–30, 13 figs. Methods employed by different shops to expedite work vary in accordance with equipment available and ideas of men in charge.

PULVERIZED COAL

Boiler Furnaces. Burning Pulverized Fuel. Southern Engr., vol. 40, no. 5, Jan. 1924, pp. 87–92, 12 figs. Application of powdered fuel to boiler furnaces (steam-power stations), and reasons for installing the system.

Locomotive Shop. Powdered Coal for Locomotive Shop, Chas. Longenecker. Iron Age, vol. 113, no. 8, Feb. 21, 1924, pp. 565–569, 6 figs. Distributed to substations and thence to individual furnaces; special design necessary for forge-furnace temperatures.

Open-Hearth Furnaces. Pulverized Coal for Open-Hearth Furnaces, W. H. Fitch. Iron Age, vol. 113, no. 7, Feb. 14, 1924, pp. 521–522. Comparisons with producer gas and fuel oil; use in air and regenerative furnaces and soaking pits.

PUMPING PLANTS

Oil-Engine-Driven Generators. Cutting Pumping Costs with Oil Engine Driven Generator, A. L. Greene. Fire & Water Eng., vol. 75, no. 5, Jan. 30, 1924, pp. 207–208 and 224–225, 5 figs. Particulars of new water-works plant at Gloucester, N. J., having motorized pumps with Diesel-engine-driven generators furnishing motive power; reasons for installing motorized pumps; conditions governing use; summary of advantages gained.

Water Works. The Somerford Pumping Station, South Staffordshire Waterworks Company, F. J. Dixon. Engineering, vol. 117, nos. 3031 and 3032, Feb. 1 and 8, 1924, pp. 155–157 and 187–189, 10 figs. Pumping plant consists of 4-cylinder Sulzer Diesel engine, driving vertical-spindle centrifugal borehole pump; details of plant and auxiliaries. (Abstract.) * Paper read before Instn. Water Engrs.

PUMPS

Drainage. Double-inlet Drowned Drainage Pumps. Engineer, vol. 136, no. 3550, Jan. 11, 1924, p. 52, 2 figs. Describes large drainage pumps manufactured for Renala irrigation scheme of Indian Government.

Mine, Metals for. Metals Used in Mine Pumps, G. A. Drysdale. Min. Congress Jl., vol. 10, no. 1, Jan. 1924, pp. 47–49. Relative value of their resistive properties.

R

RAILS

Conductor, Under-Contact Type. Under-Contact Conductor Rails. Electrician, vol. 92, no. 2381, Jan. 4, 1924, pp. 10–11, 7 figs. Describes new design giving complete protection for high-tension traction.

Welding. Manganese Special Work Welding, E. J. Shuler. Elec. Traction, vol. 20, no. 1, Jan. 1924, pp. 32–33, 4 figs. Progress in welding of manganese special work, such as solid manganese crossings, frogs and switch tongues, and manganese insert work, on lines of New Orleans Public Service Co.; shows many economies.

RAILWAY EQUIPMENT

Progress in 1923. Manufacturers Make Noteworthy Progress in 1923. Ry. Rev., vol. 74, no. 1, Jan. 5, 1924, pp. 85–93, 28 figs. Brief description of outstanding achievements of equipment builders; coaling stations, cranes and ditchers, water valves, tractors and trailers, motor cars, and machine tools.

RAILWAY MANAGEMENT

Forecasting Traffic. Forecasting Future Volume of Railway Traffic, J. B. Blood. Ry. Age, vol. 76, no. 6, Feb. 9, 1924, pp. 369–371, 3 figs. View presented on basis of mathematical study that recent estimates are not large enough.

RAILWAY MOTOR CARS

Double-Truck. A Double-Bogie Petrol Rail Car. Engineer, vol. 137, no. 3554, Feb. 8, 1924, pp. 152–153, 3 figs. Narrow-gage car built by Drewry Car Co. for Barbados Government Ry.

Gasoline. Canadian National High Power Motor Coach. Ry. Age, vol. 76, no. 5, Feb. 2, 1924, pp. 329–330, 4 figs. Seats 55 passengers; driven by 225-hp. Sterling motor; built by Nat. Steel Car Corp.

Specifications. American Gasoline Rail Car Specifications. Motor Transport (N. Y.), vol. 29, no. 12, Jan. 15, 1924, pp. 418–419. Specifications of different makes.

RAILWAY OPERATION

Expense Classification. The Proposed Operating Expense Classification. Ry. Age, vol. 76, no. 5, Feb. 2, 1924, pp. 325–328. Tentative revision of classification circulated by Bur. of Accounts of Interstate Commerce Commission.

Train Control. G. R. S. Train Control Demonstrated on C. & N. W. Ry. Elec. Engr., vol. 15, no. 1, Jan. 1924, pp. 25–26, 6 figs. Results of actual service test made by Chicago & North West. between West Chicago, Ill., and Forris (Elgin), showing practicability of Gen. Ry. Signal Co.'s system of intermittent inductive tapered train control.

Miller Train Control Stop and Speed Equipment. Ry. Elec. Engr., vol. 15, no. 1, Jan. 1924, pp. 17–19, 3 figs. Describes equipment as in service on Chicago & Eastern Illinois; pneumatic manual release positive stop valve to be mounted outside locomotive cab, and reversing mechanism to give proper protection for either forward or backward movements among recent developments.

Progress on Automatic Train Control. Ry. Rev., vol. 74, no. 1, Jan. 5, 1924, pp. 75–76. Résumé of what has been accomplished to date, and prospect for 1924.

Train Control in Service on the Rock Island. Ry. Elec. Engr., vol. 15, no. 1, Jan. 1924, pp. 5–10, 5 figs. Describes Regan Safety Devices Co. automatic train control system, intermittent ramp contact type, with speed control, installed on double-track main line of Chicago Rock Island & Pacific, between Blue Island (Chicago), Ill., and Rock Island, in compliance with Interstate Commerce Commission's order. See also Ry. Signaling, vol. 17, no. 1, Jan. 1924, pp. 9–13, 5 figs.

RAILWAY REPAIR SHOPS

Car, Scheduling System. Systematic Car Repair Work at Kent, Ohio, G. W. Armstrong. Ry. Rev., vol. 74, no. 3, Jan. 19, 1924, pp. 133–136, 8 figs. Description of system of scheduling car-repair work in Kent, Ohio, car shops of Erie Ry.

Chicago Burlington & Quincy R. R. Burlington's New Shops Greatly Increase Facilities. Ry. Rev., vol. 74, no. 1, Jan. 5, 1924, pp. 64–73, 17 figs. Chicago, Burlington & Quincy R. R. has constructed a $3,000,000 repair plant at Utah Junction, near Denver, Col., to care for all heavy repairs on its western lines as well as for those of Colorado & Southern. Describes principal buildings erected as a preliminary unit, viz., machine and erecting shop, boiler shop, blacksmith shop, power plant, storehouse and oil house. See also Ry. Jl., vol. 30, no. 1, Jan. 1924, pp. 22–26, 8 figs.

Street-Car. Repair Shops at Bathurst St., Toronto. Can. Engr., vol. 46, no. 1, Jan. 1, 1924, pp. 101–104, 5 figs. Description of new shops being built at Hillcrest by Toronto Transportation Commission; plant includes repair, assembly and subsidiary shops, large stores building, boiler house, office building, etc.

Manufactured by Advertisers — CLASSIFIED LIST OF MECHANICAL EQUIPMENT — Alphabetical List on page 150

* Foster Engineering Co.
* Fulton Co.
* Kieley & Mueller (Inc.)
Lunkenheimer Co.
* Pittsburgh Valve, Fdry. & Const. Co.
* Sarco Co. (Inc.)

Steel, Alloy
Cann & Saul Steel Co.
Union Drawn Steel Co.

Steel, Bar
Cann & Saul Steel Co.

Steel, Bright Finished
Union Drawn Steel Co.

Steel, Cold Drawn
Union Drawn Steel Co.

Steel, Cold Rolled
Cumberland Steel Co.
Union Drawn Steel Co.

Steel, Nickel
Union Drawn Steel Co

Steel, Open-Hearth
* Falk Corporation
Union Drawn Steel Co.

Steel Plate Construction
Bethlehem Shipbldg.Corp'n (Ltd)
* Bigelow Co.
* Brownell Co.
* Burhorn, Edwin Co.
* Casey-Hedges Co.
* Cole, R. D. Mfg. Co.
* Graver Corp'n
* Hendrick Mfg. Co.
* Keeler, E. Co.
Morrison Boiler Co.
Steere Engineering Co.
* Titusville Iron Works Co.
* Union Iron Works
* Vogt, Henry Machine Co.
* Walsh & Weidner Boiler Co.

Steel, Rock Drill
* Ingersoll-Rand Co.

Steel, Screw, Cold Drawn
Union Drawn Steel Co.

Steel, Strip (Cold Rolled)
Driver-Harris Co.

Steel, Tool
Cann & Saul Steel Co.

Steel, Vanadium
Union Drawn Steel Co.

Steps, Ladder & Stair (Non-Slipping)
* Irving Iron Works Co.

Stills
* Vogt, Henry Machine Co.

Stocks and Dies
* Landis Machine Co. (Inc.)

Stokers, Chain Grate
* Babcock & Wilcox Co.
* Combustion Engineering Corp'n
* Westinghouse Electric & Mfg. Co.

Stokers, Overfeed
* Detroit Stoker Co.
* Riley, Sanford Stoker Co.
* Westinghouse Electric & Mfg. Co.

Stokers, Underfeed
* American Engineering Co.
* Combustion Engineering Corp'n
* Detroit Stoker Co.
* Riley, Sanford Stoker Co.
* Sturtevant, B. F. Co.
* Westinghouse Electric & Mfg. Co.

Stools and Chairs, Metal
ManufacturingEquip.&Engrg.Co.

Strainers, Oil
* Bowser, S. F. & Co. (Inc.)
* Mason Regulator Co.

Strainers, Steam
* Foster Engineering Co.
* Kieley & Mueller (Inc.)
* Mason Regulator Co.

Strainers, Water
Elliott Co.
* Foster Engineering Co.
* Kieley & Mueller (Inc.)
* Mason Regulator Co.
* Schutte & Koerting Co.

Strainers, Water (Traveling)
Link-Belt Co.

Structural Steel Work
* Hendrick Mfg. Co.
* Walsh & Weidner Boiler Co.

Sugar Machinery
Farrel Foundry & Machine Co.
* Walsh & Weidner Boiler Co.

Superheaters, Steam
* Babcock & Wilcox Co.
* Power Specialty Co.
* Superheater Co.

Superheaters, Steam (Locomotive)
* Power Specialty Co.
* Superheater Co.

Superheaters, Steam (Marine)
* Power Specialty Co.
* Superheater Co.

Switchboards
* General Electric Co.
* Westinghouse Electric & Mfg. Co.

Switches, Electric
* General Electric Co.
* Westinghouse Electric & Mfg. Co.

Synchronous Converters
(See Converters, Synchronous)

Tables, Drawing
Dietzgen, Eugene Co.
Economy Drawing Table & Mfg. Co.
Electro Sun Co. (Inc.)
Keuffel & Esser Co.
New York Blue Print Paper Co.
ParVell Laboratories
U. S. Blue Co.
Weber, F. Co. (Inc.)

Tachometers
* American Schaeffer & Budenberg Corp'n
* Bristol Co.
Veeder Mfg. Co.

Tachoscopes
* American Schaeffer & Budenberg Corp'n

Tanks, Acid
* Graver Corp'n
* Walsh & Weidner Boiler Co.

Tanks, Ice
* Frick Co. (Inc.)
* Graver Corp'n

Tanks, Oil
* Graver Corp'n
* Hendrick Mfg. Co.
Morrison Boiler Co.
Nugent, Wm. W. & Co. (Inc.)
* Scaife, Wm. B. & Sons Co.
* Titusville Iron Works Co.
* Walsh & Weidner Boiler Co.

Tanks, Pressure
* Brownell Co.
* Graver Corp'n
* Hendrick Mfg. Co
Morrison Boiler Co.
* Titusville Iron Works Co.
* Vogt, Henry Machine Co.
* Walsh & Weidner Boiler Co.

Tanks, Steel
Bethlehem Shipbldg.Corp'n (Ltd.)
* Bigelow Co.
* Brownell Co.
* Casey-Hedges Co.
* Cole, R. D. Mfg. Co.
* Graver Corp'n
* Hendrick Mfg. Co.
Morrison Boiler Co.
* Scaife, Wm. B. & Sons Co.
* Titusville Iron Works Co.
* Union Iron Works
* Vogt, Henry Machine Co.
* Walsh & Weidner Boiler Co.

Tanks, Storage
* Brownell Co.
* Cole, R. D. Mfg. Co.
* Combustion Engineering Corp'n
* Graver Corp'n
* H. S. B. W.-Cochrane Corp'n
* Hendrick Mfg. Co.
Herbert Boiler Co.
Morrison Boiler Co.
Nugent, Wm. W. & Co. (Inc.)
* Scaife, Wm. B. & Sons Co.
* Titusville Iron Works Co.
* Vogt, Henry Machine Co.
* Walsh & Weidner Boiler Co.

Tanks, Tower
* Graver Corp'n
* Walsh & Weidner Boiler Co.

Tanks, Welded
* Cole, R. D. Mfg. Co.
* Graver Corp'n
Morrison Boiler Co.
* Scaife, Wm. B. & Sons Co.

Tap Extensions
Allen Mfg. Co.

Tapping Attachments
* Whitney Mfg. Co.

Temperature Regulators
(See Regulators, Temperature)

Testing Laboratories, Cement
* Smidth, F. L. & Co.

Textile Machinery
* Franklin Machine Co.

Thermometers
* American Schaeffer & Budenberg Corp'n
* Ashton Valve Co.
* Bristol Co.
* Sarco Co. (Inc.)
* Tagliabue, C. J. Mfg. Co.
* Taylor Instrument Cos.

Thermometers, Chemica
* Tagliabue, C. J. Mfg. Co.

Thermometers, Distance
* Taylor Instrument Cos.

Thermometers, High Range (Recording)
* Bailey Meter Co.
* Tagliabue, C. J. Mfg. Co.
* Taylor Instrument Cos.

Thermometers, Industrial
* Tagliabue, C. J. Mfg. Co.

Thermostats
* Bristol Co.
* Fulton Co.
* General Electric Co.

Thread Cutting Tools
* Crane Co.
* Jones & Lamson Machine Co.
* Landis Machine Co. (Inc.)

Threading Machines, Pipe
* Landis Machine Co. (Inc.)

Tie Tamping Outfits
* Ingersoll-Rand Co.

Time Recorders
* Bristol Co.

Tinsmiths' Tools and Machines
* Niagara Machine & Tool Works

Tipples, Steel
Link-Belt Co.

Tobacco Machinery
* American Machine & Foundry Co.

Tongs, Crane
* Kenworthy, Chas. F. (Inc.)

Tools, Brass-Working Machine
* Warner & Swasey Co.

Tools, Machinists' Small
* Atlas Ball Co.

Tools, Pneumatic
* Ingersoll-Rand Co.

Tools, Special
DuPont Engineering Co.

Tracks, Industrial Railway
Easton Car & Construction Co.
Northern Engineering Works

Tractors
* Allis-Chalmers Mfg. Co.

Tractors, Industrial (Storage Battery)
* Yale & Towne Mfg. Co.

Tractors, Turntable
* Whiting Corp'n

Trailers, Industrial
* Yale & Towne Mfg. Co.

Tramrail Systems, Overhead
* Brown Hoisting Machinery Co.
Link-Belt Co.
Northern Engineering Wks.
Reading Chain & Block Corp'n
* Whiting Corp'n

Tramways, Bridge
Link-Belt Co.

Tramways, Wire Rope
Clyde Iron Works Sales Co.
Lidgerwood Mfg. Co.
* Roebling's, John A. Sons Co.

Transfer Tables
* Whiting Corp'n

Transformers, Electric
* Allis-Chalmers Mfg. Co.
* General Electric Co.
* Westinghouse Electric & Mfg. Co.

Transmission Machinery
(See Power Transmission Machinery)

Transmissions, Automobile
* Foote Bros. Gear & Machine Co.

Transmissions, Variable Speed
* American Fluid Motors Co.

Traps, Radiator
* American Radiator Co.
* Sarco Co. (Inc.)

Traps, Return
* American Blower Co.
* Crane Co.
* Kieley & Mueller (Inc.)

Traps, Steam
* American Blower Co.
* American Schaeffer & Budenberg Corp'n
* Crane Co.
Elliott Co.
* Jenkins Bros.
Johns-Manville (Inc.)
* Kieley & Mueller (Inc.)
* Reading Steel Casting Co. (Inc.)
(Pratt & Cady Division)
* Sarco Co. (Inc.)
* Schutte & Koerting Co.
Squires, C. E. Co.
* Vogt, Henry Machine Co.

Traps, Vacuum
* American Blower Co.
* American Schaeffer & Budenberg Corp'n
* Crane Co.
* Sarco Co. (Inc.)

Treads
* Irving Iron Works Co.

Treads, Stair (Rubber)
* United States Rubber Co.

Trolleys
* Brown Hoisting Machinery Co.
Reading Chain & Block Corp'n
* Whiting Corp'n

Trucks, Industrial (Storage Battery)
* Yale & Towne Mfg. Co.

Trucks, Trailer
* Yale & Towne Mfg. Co.

Tubes, Boiler, Seamless Steel
* Casey-Hedges Co.

Tubes, Condenser
* Scovill Mfg. Co.
* Wheeler Condenser & Engrg. Co.

Tubes, Pitot
Bacharach Industrial Instrument Co.

Tubing, Rubber
* Goodrich, B. F. Rubber Co.
* United States Rubber Co.

Tubing, Rubber (Hard)
* Goodrich, B. F. Rubber Co.

Tumbling Barrels
Farrel Foundry & Machine Co.
Northern Engineering Works
* Royersford Fdry. & Mach. Co.
* Whiting Corp'n

Turbines, Hydraulic
* Allis-Chalmers Mfg. Co.
* Cramp, Wm. & Sons Ship & Engine Bldg. Co.
Hoppes Water Wheel Co.
* Leffel, James & Co.
Newport News Shipbuilding & Dry Dock Co.
Smith, S. Morgan Co.
* Worthington Pump & Mchry. Corp'n

Turbines, Steam
* Allis-Chalmers Mfg. Co.
* Coppus Engineering Corp'n
* De Laval Steam Turbine Co.
* General Electric Co.
* Kerr Turbine Co.
Ridgway Dynamo & Engine Co.
* Sturtevant, B. F. Co.
* Terry Steam Turbine Co.
* Westinghouse Elec. & Mfg. Co.
* Wheeler Condenser & Engrg. Co.

Turbo-Blowers
* Coppus Engineering Corp'n
* General Electric Co.
* Ingersoll-Rand Co.
* Kerr Turbine Co.
* Sturtevant, B. F. Co.

Turbo-Compressors
* Ingersoll-Rand Co.

Turbo-Generators
* Allis-Chalmers Mfg. Co.
* De Laval Steam Turbine Co.
* General Electric Co.
* Kerr Turbine Co.
Ridgway Dynamo & Engine Co.
* Sturtevant, B. F. Co.
* Terry Steam Turbine Co.
* Westinghouse Electric & Mfg. Co.

Turbo-Pumps
Bethlehem Shipbldg.Corp'n (Ltd.)
* Coppus Engineering Corp'n
* Kerr Turbine Co.
* Terry Steam Turbine Co.
* Wheeler Condenser & Engineering Co

Turntables
Easton Car & Construction Co.
Link-Belt Co.
Northern Engineering Works
* Whiting Corp'n

Turret Machines
(See Lathes, Turret)

Unions
* Crane Co.
* Edward Valve & Mfg. Co.
Lunkenheimer Co.
* Pittsburgh Valve, Fdry. & Const. Co.
* Vogt, Henry Machine Co.

Unions, Pressed Steel
Rockwood Sprinkler Co.

Unloaders, Air Compressor
* Ingersoll-Rand Co.
* Worthington Pump & Machinery Corp'n

Unloaders, Ballast
Lidgerwood Mfg. Co.

Unloaders, Car
* Gifford-Wood Co.
Link-Belt Co.

*Catalogue data of firms marked * appear in the A.S.M.E. Condensed Catalogues of Mechanical Equipment, 1923-24 Volume*

RAILWAY SHOPS

Tire-Heating Plant. Electric Tyre Heating Plant at the Acton Works of the Metropolitan District Railway Company. Tramway & Ry. World, vol. 55, no. 3, Jan. 17, 1924, pp. 17–19, 6 figs. Comprises two Oerlikon tyre heaters, each having rating of 60 kva.; heaters consist of a transformer with a single primary winding. Describes installation and its operation.

RAILWAY SIGNALING

Automatic Block. Signal and Interlocking Construction Shows Nice Increase. Ry. Signaling, vol. 17, no. 1, Jan. 1924, pp. 17–30, 1 fig. Automatic train control, economics of signaling and remote operation of switches received marked attention in 1923. Tables giving automatic block signals and interlocking plants installed during 1923, under construction Jan. 1, 1924, and contemplated for 1924.

Single-Line Switching-Out. Switching-Out Single-Line Token Instruments. Ry. Gaz., vol. 40, no. 4, Jan. 25, 1924, pp. 107–110, 6 figs. Describes simple means by which any number of intermediate single-line token stations may be switched out at times when traffic is light, and indicates in particular, how this has been effected on Lond. Midland & Scottish Ry.

RAILWAY TIES

Preservative Treatment. The Financial Aspect of Tie Preservation, H. S. Sackett. Ry. Age, vol. 76, no. 7, Feb. 16, 1924, pp. 423–424. Analysis of economy of protecting timber against decay and returns from treatment.

Wood Preservers Show Economy of Treatment. Ry. Age, vol. 76, no. 3, Jan. 19, 1923, pp. 233–235, 1 fig. Results of tests and service records on use of creosote-petroleum oil mixture for treating ties; increases tie life; promises to cut cost. Abstract of Am. Wood-Preservers' Assn. report.

RAILWAY TRACK

Double Tracking and Grade Reduction. Frisco Makes Important Line Improvements. Ry. Age, vol. 76, no. 4, Jan. 26, 1924, pp. 275–279, 10 figs. Double tracking and grade reduction at several points by St. Louis-San Francisco effect marked saving with limited expenditures.

Elevation. Rogers Park Track Elevation, C. M. & St. P. Ry., T. H. Strate. Ry. Rev., vol. 74, no. 3, Jan. 19, 1924, pp. 140–145, 13 figs. Describes work of elevating Chicago & Evanston division between Irving Park boulevard and Howard Street in Chicago, Ill., operated by Northwestern Elevated R. R. Co., eliminating grade crossing.

Maintenance. Maintenance Methods on the Lehigh Valley R. R., G. L. Moore. Ry. Rev., vol. 74, no. 2, Jan. 12, 1924, pp. 101–103, 5 figs. Summary of results obtained by use of heavy rail and economy in labor.

RAPID TRANSIT

Financing of Systems. Detroit Rapid Transit Plant Financed by Direct Assessment. Eng. & Contracting (Railways), vol. 61, no. 1, Jan. 16, 1924, pp. 131–134. New basis for providing funds for proposed system of subways or elevated lines.

REFRIGERANTS

Sulphur Dioxide. Thermal Properties of Sulphur Dioxide, D. L. Fiske. Refrig. Eng., vol. 10, no. 6, Dec. 1923, pp. 197–200 and 204, 3 figs. Work undertaken to derive results to cover properties of superheated and saturated regions with a thermodynamically consistent set of equations.

REFRIGERATING MACHINES

Autofrigor. The "Autofrigor" Refrigerating Machine. Engineering, vol. 117, no. 3030, Jan. 25, 1924, p. 104. 4 figs. Small cold-storage apparatus suitable for private users, shopkeepers, etc.; is perfectly self-contained piece, electrically driven, and adaptable to practically any type of cold cupboard or chamber.

Evaporating Systems. Evaporating Systems for Refrigerants, W. F. Davis. Ice & Refrigeration, vol. 66, no. 1, Jan. 1924, pp. 7–10 and (discussion) 10–12. Past and present evaporators; details of design; foundation for evaporators; purifying refrigerant. Paper read at N. A. P. R. E. Convention. See also Refrig. World, vol. 59, no. 1, Jan. 1924, pp. 23–24.

REFRIGERATING PLANTS

Ammonia Condensers. Investigations of Ammonia Condensers, T. Shipley. Ice & Refrigeration, vol. 66, no. 1, Jan. 1924, pp. 17–22, 2 figs. Discusses condensers used on ammonia compression plants. Results of earlier investigations; advantages of low condenser pressures; development of design of Hestonville condenser and author's reasons for assuming such a design would give better results than other types; results of tests. Paper read before N. A. P. R. E.

Electric Equipment Control. Control of Electrical Equipment in Refrigerating Plants, H. P. Hill. Ice & Refrigeration, vol. 66, no. 1, Jan. 1924, pp. 22–26, 3 figs. Discusses transformers, starting of synchronous motors, keeping ice plant in continuous operation, etc. Paper read before N. A. P. R. E.

Small. Why the Small Refrigerating Plant Predominates in California, H. L. Lincoln. Power, vol. 59, no. 6, Feb. 5, 1924, pp. 217–218, 2 figs. Questions arising in considering proper prime movers to install; kind of cooling water used; design of condenser found desirable.

REGULATORS

Pressure. An Automatic Pressure Regulator, L. E. Dawson. Indus. & Eng. Chem., vol. 16, no. 2, Feb. 1924, pp. 160–161, 1 fig. Apparatus satisfactorily maintains steady pressure for period of days with maximum variation of only 2 or 3 mm. of mercury when operating under 500 mm. vacuum.

RESEARCH

Statistical Methods, Application of. Some Applications of Statistical Methods to the Analysis of Physical and Engineering Data, W. A. Shewhart. Bell System Tech. Jl., vol 3, no. 1, Jan. 1924, pp. 43–87, 13 figs. Deals with application of elementary statistical methods for finding best frequency distribution of deviations; points out limitations of theory of errors, based on normal law; advantages to be gained by physicist or engineer from an application of methods reviewed.

ROLLING MILLS

Alloy-Steel Rolling. Rolling Alloy Steel, J. Clausen. Blast Furnace & Steel Plant, vol. 12, no. 2, Feb. 1924, pp. 113–116 and 133, 5 figs. Practice at plant of Harrisburg Pipe & Pipe Bending Co.

Cold-Rolling Strip Mills. Acme Steel Expands Cold Strip Capacity, G. L. Lacher. Iron Age, vol. 113, no. 5, Jan. 31, 1924, pp. 353–358, 7 figs. Features include recoiler, cooling gas for annealing, automatic roll grinder; material-handling facilities. See also Iron Trade Rev., vol. 74, no. 5, Jan. 31, 1924, pp. 359–362, 8 figs.

Tolerances in Rolling Sheets. Tolerances in the Rolling of Steel Sheets. Iron Age, vol. 113, no. 7, Feb. 14, 1924, pp. 497–499. Causes of variations from gage and reasons for current practice presented from mill standpoint.

RULING MACHINES

Grating. Ruling 15,000 Lines per Inch, F. A. Stanley. Am. Mach., vol. 60, no. 5, Jan. 31, 1924, pp. 161–166, 11 figs. Machine for ruling gratings and how it was built; lapping lead screw to correct errors; testing corrections with interferometer.

S

SAND, MOLDING

Testing. Points Need for Sand Test, Eugene W. Smith. Foundry, vol. 52, no. 3, Feb. 1, 1924, pp. 86–87. Suggests adoption of simple vibratory test for determining relation of silica and bond contents and influence upon casting losses. (Abstract.) Paper presented at Detroit Foundrymen's Assn.

SCALES

Locomotive. A Unique Locomotive Weighing Plant, C. C. Bailey. Baldwin Locomotives, vol. 2, no. 3, Jan. 1924, pp. 56–62. 7 figs. Comprises platform track scale of immense proportions, 24 individual wheel scales, concrete scale foundations of massive construction, and specially designed and well-equipped building which covers and protects scale and its mechanism.

SCREW MACHINES

Automatic. National-Acme Five-Spindle Automatic. Machy. (N. Y.), vol. 30, no. 6, Feb. 1924, pp. 473–475, 4 figs. Provision of five spindles instead of four permits distribution of cutting strains over larger number of tools, and as result, there is less tendency for strain to occur at points where heavy cuts are being taken.

SHAFTS

Whirling. The Whirling of Shafts, J. Frith and F. Buckingham. Instn. Elec. Engrs.—Jl., vol. 62, no. 325, Jan. 1924, pp. 107–113, 8 figs. Seeks to explain phenomenon of whirling by proving that it is essentially case of vibration and obeys laws of vibration, especially those relating to phase change between disturbing force and resulting displacement; describes experimental verifications of theories put forward.

SHEET-METAL WORKING

British Factories. Sheet Metal Working in British Factories, W. J. Hiscox. Sheet Metal Worker, vol. 14, no. 26, Jan. 18, 1924, pp. 995–996 and 1016. Conditions under which sheet metal department in manufacturing plants is operated; inadequate equipment prevalent.

SMOKE ABATEMENT

Steam Plants. Methods of Preventing Smoke in Small Steam Plants, and Cheap Furnaces That Will do It, O. H. Wood. Southern Engr., vol. 40, no. 5, Jan. 1924, pp. 84–87, 4 figs. Human element a factor, also design of furnace, and grates.

SOLDERING

Gold and Silver. The Soldering and Finishing of Precious Metals. English Mechanics, vol. 98, no. 3067, Jan. 4, 1924, pp. 342–343. Useful information on soldering of gold and silver, and on finishing processes.

SOOT BLOWERS

Types. Soot and Soot Blowers. Southern Engr., vol. 40, no. 5, Jan. 1924, pp. 29–37, 30 figs. Why soot accumulates on boiler tubes; cost of soot accumulation, methods of removing it and application of various types of soot blowers to different kinds of boilers.

SPARK PLUGS

Electrode Temperature. The Effect of Electrode Temperature on the Sparking Voltage of Short Spark Gaps, F. B. Silsbee. Nat. Advisory Committee for Aeronautics—Report, no. 179, 1923, 10 pp., 4 figs. Investigation shows quite definitely that voltage required to produce spark across short spark gap is appreciably reduced by raising temperature of one electrode.

SPRINGS

Ring. Characteristics of the Ring Spring, O. R. Wikander. Am. Mach., vol. 60, no. 7, Feb. 14, 1924, pp. 253–254, 2 figs. Recently developed spring; material stressed in pure tension and compression under load; calculations for theoretical pressure; test results in railway work.

Material Testing. What Are the Best Mechanical Tests for Spring Materials? W. Rosenhain. Automotive Industries, vol. 50, no. 6, Feb. 7, 1924, pp. 278–280. Difficult to determine quantitative relation between various qualities such as strength, hardness, resistance to shock, etc.; actual value of test results should be considered; author claims adequate specifications are still lacking.

STEAM

Calorimetric Examination. A Calorimetric Method of Surveying the Behavior of Steam, N. S. Osborne. Mech. Eng., vol. 46, no. 2, Feb. 1924, pp. 88–90, 2 figs. Describes elements of method forming basis of experimental program on properties of steam upon which Bur. of Standards is engaged.

Production, Effect of Sulphur on. The Effect of Sulphur on Steam Production, T. A. Marsh. Combustion, vol. 10, no. 2, Feb. 1924, pp. 123–124. The serious increase in cost of steam due to necessity for combating effect of this element in coal.

Research. Progress in Steam Research. Mech. Eng., vol. 46, no. 2, Feb. 1924, pp. 81–87 and 108, 13 figs. Contains following reports in abstract: Report on Progress in Steam Research at the Bureau of Standards, N. S. Osborne and H. F. Stimson; Progress of the M.I.T. Portion of the Steam Investigation, F. G. Keyes; Progress Report on Work at Harvard University on the Joule-Thomson Effect, R. V. Kleinschmidt; Progress Report on the Joule-Thomson Effect, H. M. Davis.

Superheating. Superheated Steam and Superheaters. Southern Engr., vol. 40, no. 5, Jan. 1924, pp. 93–100, 16 figs. Advantages of superheated steam, its characteristics, uses, application and particulars regarding several designs in common use.

STEAM-ELECTRIC PLANTS

Coal-Mine. A Modern Colliery Power Plant, E. L. Hann. S. Wales Inst. Engrs.—Proc., vol. 39, no. 5, Jan. 12, 1924, pp. 583–631, 29 figs. partly on supp. plates. Description of power scheme, of Powell Duffryn Steam Coal Co., Ltd., which has been installed in Rhymney Valley for purpose of providing a cheap power supply in such quantity as to enable machine mining to be developed to its fullest extent, and electrical drives to be employed in all cases in which it appears to be economically correct to do so.

STEAM METERS

Types. Measurement of Steam. Times Trade & Eng. Supp., vol. 13, no. 288, Jan. 12, 1924, p. 439. Types of steam meters; principles of operation; some actual devices.

STEAM POWER PLANTS

Condenser Operation in. Profit Possibilities of Vacuum in the Power Plant Jas. T. Beard, 2nd. Indus. Mgt. (N. Y.), vol. 67, no. 2, Feb. 1924, pp. 115–119, 5 figs. Discusses possibilities of condenser operation and how to realize them.

Fuel for Coal-Fired. Fuel for Small Coal Fired Steam Generating Plants, F. J. Paque. Combustion, vol. 10, no. 2, Feb. 1924, pp. 120–122, 2 figs. Discusses requirements to be met by a given fuel in relation to the various types of fuel available to average small plant.

Laundry. A Modern Laundry Power Plant. Power, vol. 59, no. 5, Jan. 29, 1924, pp. 162–164, 3 figs. Describes new plant of Great West. Laundry Co., Chicago, in which problem was to balance power-steam with exhaust-steam requirements for heating laundry water; in boiler room fuel spreaders and unusual methods of controlling automatically feed of coal and water are features.

Motor-Driven Auxiliaries. Power Plant Auxiliaries and Their Relation to Heat Balance, A. L. Penniman, Jr. Am. Inst. Elec. Engrs.—Jl., vol. 43, no. 2, Feb. 1924, pp. 118–121, 1 fig. Points out economy of stage bleeding together with electric drive, and describes use of auxiliary generator connected to and driven by main turbine.

Sand Mills and Pits. Ottawa Silica Co. Operates New Plant. Power Plant Eng., vol. 28, no. 4, Feb. 15, 1924, pp. 215–218, 7 figs. Expected economy realized by construction of new central steam-generating plant in place of two old boiler houses, which supplies steam for two sand-preparing mills and two sand pits.

STEAM TRAPS

Applications. Principles and Applications of Modern Steam Traps, W. E. Biggs and W. R. Woolrich. Nat. Engr., vol. 28, no. 2, Feb. 1924, pp. 56–58, 2 figs. Factors to be considered in selection of a steam trap for a given purpose; classification and applications of different types with suggestions for their installation and operation.

Types. Steam Traps of Various Makes and Their Operation. Southern Engr., vol. 40, no. 5, Jan. 1924, pp. 51–63, 29 figs. Describes designs, and discusses manner in which they perform their work.

STEAM TURBINES

Back-Pressure. Performance Tests on a Back-Pressure Turbine in a German Sugar Refinery (Leistungsversuche an einer Gegendruckturbine der ersten Brünner Maschinenfabriks-Gesellschaft in der Nestomitzer Zuckerraffinerie in Nestomitz a. E.), E. Josse and A. Stodola. Zeit. des Vereines deutscher Ingenieure, vol. 67, no. 52, Dec. 29, 1923, pp. 1163–1168, 1 fig. Describes notable improvement in design of high-pressure turbines; results of tests on turbine built by Brünner Maschinenfabriks Gesellschaft show efficiency of 85 per cent.

Foundations. Checking Foundations for Large

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Turbines. Power, vol. 59, no. 4, Jan. 22, 1924, pp. 135–137, 2 figs. Discusses requirements for foundations for Westinghouse turbines, as well as inspections before installing unit, such as ordinarily devolve upon service engineer in charge of erecting work.

Isolated Plants. Applications of Steam Turbines for Isolated Plants, C. L. Hubbard. Nat. Engr., vol. 28, no. 1, Jan. 1924, pp. 14–17, 7 figs. Description of the different types of steam turbines and their operating principles; comparative advantages of turbines and reciprocating engines; comparative performance of engines and turbines; factors to be considered in selection of a prime mover.

Steam-Air Drive for Motorships. Steam-Air Turbines for Auxiliary-Engine Drive, Especially on Motorships (Dampf-Luft-Turbinen für Hilfsmaschinenantrieb, insbesonderer auf Motorschiffen), H. Melan. Zeit. des Vereines deutscher Ingenieure, vol. 68, no. 2, Jan. 12, 1924, p. 28, 1 fig. Deals with drive of auxiliary engines on motor tank ships; steam, air and steam-air drive; tests at Kiel shipyard of the Deutsche Werke on reciprocating engines and turbines; graphic reproduction of results with steam-air turbines; conclusions.

Types and Selection. The Control of Power Production, Chas. L. Hubbard. Factory, vol. 32, no. 2, Feb. 1924, pp. 166–169, 204, 206 and 208, 18 figs. Types of steam turbines and their selection.

STEEL

Micrographic Study. Micrographic Study of Plain Carbon Steel, R. Rimbach. Forging—Stamping—Heat Treating, vol. 10, no. 1, Jan. 1924, pp. 46–50, 33 figs. Presents very complete set of microphotographs showing effect of various heat treatments on 1.12 carbon steel.

Nickel. See NICKEL STEEL.

Tool. See TOOL STEEL.

STEEL CASTINGS

Heat Treatment. Making Steel Castings as Tough as Forgings, L. R. Mann. Can. Foundryman, vol. 15, no. 1, Jan. 1924, pp. 16–17, 2 figs. Proper heat treatment insures properties being imparted to metal which are comparable to those found in best forged steel. Extracts from paper read before Wis. Foundrymen's Assn.

Manufacture. Speeding Up the Production of Large and Superior Steel Castings, S. G. Roberts. Compressed Air Mag., vol. 29, no. 1, Jan. 1924, pp. 731–736, 16 figs. Use of compressed air and pneumatic tools in plant of Wheeling Mold & Foundry Co., Wheeling, W. Va.; time and money saved, and large castings of a complicated character can be turned out rapidly with assurance of success.

STEEL, HEAT TREATMENT OF

Brazed and Welded Steel. Some Effects of Brazing and Welding, H. C. Knerr. Forging—Stamping—Heat Treating, vol. 10, no. 1, Jan. 1924, pp. 33–37, 20 figs. Application of heat as in brazing and welding removes strength produced by cold working; effect of heat treatment on brazed and welded steel.

Liquid Heating. Advantages of Uniformity in Heat Treatment, A. E. Bellis. Can. Machy., vol. 31, no. 4, Jan. 24, 1924, pp. 17–18, 4 figs. Notes on method of heat treating using a liquid heating medium; its advantages; possibilities of overcoming temperature troubles by using this method becoming more widely recognized.

Mild Steel. The Heat Treatment of Mild Steel, R. T. Rolfe. Metal Industry (Lond.), vol. 24, nos. 1, 2 and 3, Jan. 4, 11 and 18, 1923, pp. 9–10, 33–34, and 57–59, 10 figs. Structure of mild steel; need for heat treatment of mild steel; heat treating castings; mechanism of heat treatment; burnt steel; typical range of properties obtainable; heat treating forgings; work hardening; breaking-down of pearlite; etc.

Piston Pins and Shackle Bolts. Individual Heat Treatment Will Improve Quality of Product, C. N. Dawes. Automotive Industries, vol. 50, no. 4, Jan. 24, 1924, p. 177, 2 figs. Special furnaces developed for handling of piston pins and shackle bolts make it possible to treat each part separately; specific requirements should determine furnace type used.

STEEL INDUSTRY

South Africa. Steel Development in South Africa. Engineer, vol. 137, no. 3554, Feb. 8, 1924, pp. 144–145. Iron-ore deposits; Newcastle blast furnace; work being undertaken and new program.

STEEL MANUFACTURE

Basic. Examination of Metallurgical Processes in the Basic Process According to the Flame Gases (Beurteilung der metallurgischen Prozesse beim Thomasverfahren nach den Flammengasen), G. Bulle. Stahl u. Eisen, vol. 44, no. 1, Jan. 3, 1924, pp. 9–11 and (discussion) 11–14, 8 figs. Flame gases in open-hearth and basic processes; practical examples with Thomas converter; conclusions; measuring device.

STEEL WORKS

Electrical Developments. Achievements in the Steel Industry During the Year 1923, G. E. Stoltz. Iron & Steel Engr., vol. 1, no. 1, Jan. 1924, pp. 55–58, 4 figs. Large number of electric motors being installed to replace steam engines. Describes electrical installations made.

Italy. The Lombardy Iron and Steel Works. Iron & Coal Trades Rev., vol. 108, no. 2915, Jan. 11, 1924, pp. 50–51, 19 figs. partly on pp. 61–64. Describes Sesto San Giovanni, Milan, Vobarno, and Dongo works of Societá Anonima Acciaierie e Ferriere Lombarde. See also description of Sesto San Giovanni Works in Foundry Trade Jl., vol. 29, no. 388, Jan. 24, 1924, pp. 71–74, 5 figs.

STOKERS

Automatic. Mechanical Automatic Stokers. Southern Engr., vol. 40, no. 5, Jan. 1924, pp. 74–83, 23 figs. Necessity of mechanical stoker from standpoint of capacity and economy; several types of stokers.

SUBWAYS

Train-Movement Noise, Reduction of. Reducing Noise in Train Operation. Elec. Ry. Jl., vol. 63, no. 4, Jan. 26, 1924, pp. 135–138. Results of extended series of tests made by Underground Elec. Rys. of Lond. Methods developed for preventing noise from entering cars; sound-absorbing material placed in roof, walls and floor; heavy closed windows, special ventilators and shrouding of trucks are principal features incorporated in new cars.

T

TELESCOPES

Development. The Growth of the Telescope, Wm. J. S. Lockyer. Sci. Monthly, vol. 18, no. 1, Jan. 1924, pp. 92–104, 4 figs. History of development of astronomical telescope.

TERMINALS, RAILWAY

Freight. Clifton Forge (Va.) Terminal Involves Heavy Work. Ry. Age, vol. 76, no. 6, Feb. 9, 1924, pp. 365–367, 4 figs. Progress made in construction of new facilities by Chesapeake & Ohio; involve construction of enlarged and modern freight terminal, including total of 66 mi. of tracks over area of 636 acres. See also Ry. Rev., vol. 74, no. 6, Feb. 9, 1924, pp. 241–248, 16 figs.

THERMODYNAMICS

Third Law. A Statement of the Third Law of Thermodynamics, E. D. Eastman. Am. Chem. Soc.—Jl., vol. 46, no. 1, Jan. 1924, pp. 39–43. Argument is made that there is in ideal case no sharp dividing line between crystalline and (supercooled) liquid states; statement of third law is proposed which is in harmony with ideas expressed.

Water-Vapor Diagram. Straight-Line Water-Vapor Diagram for the Standard and High-Pressure Ranges (Geradliniges Wasserdampf-Diagramm für Normal- und Hochdruckgebiet), M. Seiliger. Zeit. des Vereines deutscher Ingenieure, vol. 68, no. 2, Jan. 12, 1924, pp. 25–27, 2 figs. Based on the Callendar-Mollier formulas for water vapor, author develops a new diagram, and claims to show that nearly all changes of state of water vapor can be expressed by straight lines.

TIRES, RUBBER

Bicycle. Manufacture of Cycle Tires. India Rubber World, vol. 69, no. 4, Jan. 1, 1924, pp. 227–228, 4 figs. Healey-Shaw process; describes fabric slitting, wire covering, spool wrapping, foundation building, vulcanizing.

Curing, Temperature Measurement. The Measurement of Temperature in Pneumatic and Solid Tyres During Cure, A. A. Perks and R. W. Griffiths. India-Rubber Jl., vol. 67, no. 1, Jan. 5, 1924, pp. 13–16 and 19–21, 11 figs. Use of a calibrated thermo-junction, inserted in required position, for obtaining record of temperature during cure at any part of a tire; details of methods which have proved successful, and some results obtained.

Low-Pressure. Building Balloon Tires. India Rubber World, vol. 69, no. 4, Jan. 1, 1924, pp. 217–218, 5 figs. Reason for balloon tires; production operations similar to high-pressure tires; Thropp system; band building; applying fabric bands.

TOOL STEEL

Hardness Tests. Comparative Tests of Hardness of Various Steel Tools at High Temperatures (Essais comparatifs de dureté à chaud sur divers aciers á outils), J. Cohade. Revue Universelle des Mines, vol. 1, no. 2, Jan. 15, 1924, pp. 75–104, 16 figs. Brief review of previous work on subject and discussion of author's own tests, carried out at works of Schmidt & Co. at Creusot, France; describes heat treatment to which steels were subjected previous to tests and method of testing, and gives results obtained.

TOOLS

Cross-Slide Facing. Cross Slide Facing Tools for Automatics, F. O. Hickling. Machy. (Lond.), vol. 23, no. 589, Jan. 10, 1924, pp. 483–484, 3 figs. Discusses troubles that are encountered and gives examples of how difficulties have been overcome.

Economical Production. Economical Production of Workpieces (Wirtschaftliche Fertigung von Werkstücken), J. Marretsch. Werkstattstechnik, vol. 18, no. 1, Jan. 1, 1924, pp. 4–7, 46 figs. Use of economical devices in quantity and series production; economical production of turning, boring and milling tools in factory.

TRAILERS

Motor-Transport. Details of the H. I. C. Motor Transport Trailer. Engineering, vol. 117, no. 3032, Feb. 8, 1924, p. 186, 13 figs. partly on p. 178. Has advantage of shock reduction through exceptional springing.

TRANSPORTATION

Barge Line. Federal Barge Line Proving Costly Experiment. Ry. Age, vol. 76, no. 6, Feb. 9, 1924, pp. 381–383, 3 figs. Mississippi-Warrior service an unprofitable venture, although handling capacity traffic.

Coördination of National Systems. Declarations of the Transportation Conference. Ry. Age, vol. 76, no. 3, Jan. 19, 1923, pp. 237–243. Findings and conclusions of Nat. Transportation Conference called by U. S. Chamber of Commerce, in regard to governmental relations to railroad transportation, railroad consolidations, readjustment of relative freight-rate schedules, relation of highways and motor transport to other transportation agencies, development of waterways and coördination of rail and waterway service, and taxation of transportation agencies. See also Ry. Rev., vol. 74, no. 3, Jan. 19, 1924, pp. 154–156.

TUBES

Bending Stresses. Bending Stresses in Thin-Walled Tubes, J. Case. Lond., Edinburgh, & Dublin Philosophical Mag. & Jl. Sci., vol. 47, no. 277, Jan. 1924, pp. 197–208, 6 figs. Investigation of stresses in thin tubular beam, such as steel factory chimneys, monocoque fuselages of airplanes, hulls of submarine vessels, and the like.

Charcoal-Iron, Manufacture. Producing Charcoal Iron Tubes, G. H. Woodroffe. Iron Trade Rev., vol. 74, no. 7, Feb. 14, 1924, pp. 482–487, 10 figs. Methods employed by Parkesburg Iron Co., Parkesburg, Pa., in manufacture of charcoal iron tubes.

Steel, Seamless. Manufacture of Seamless Steel Tubes and Cylinders, A. R. Chaytor. Mech. World, vol. 75, no. 1932, Jan. 11, 1924, pp. 27–29. Historical review; difficulties encountered in early processes; material for manufacture; process and plant employed in manufacture; cold drawing. Paper read before Jr. Instn. Engrs.

TURBO-ALTERNATORS

Tests. Turbo-Alternator Tests, John Bruce. Elec. Rev., vol. 94, no. 2406, Jan. 4, 1924, pp. 4–6, 7 figs. Résumé of methods of making principal measurements and apparatus used in official and routine testing of turbo-alternator units, in case of large electricity supply undertaking.

TURBO-GENERATORS

30,000-Kw. 30,000 K. W. Steam Turbo-Generator at Rotherdam. Engineering, vol. 117, nos. 3029 and 3031, Jan. 18 and Feb. 1, 1924, pp. 65–67 and 134–136, 49 figs. partly on supp. plates. Machine is largest yet constructed in England, and one of largest in world to develop its power in single casing; built by Brit. Thomson-Houston Co. and is of their multi-stage impulse type.

V

VENTURI METERS

Pulsating Flow. Venturi Meter for Pulsating Flow. Engineering, vol. 137, no. 3027, Jan. 4, 1924, pp. 7–9, 14 figs. Describes new type of instrument known as 1922 Venturi Recorder, which appears to have overcome serious objection to Venturi meter when working with pulsating flow.

VIBRATIONS

Machinery. Vibration and Structural Damage, E. Latham. Engineering, vol. 117, no. 3032, Feb. 8, 1924, pp. 163–164, 4 figs. Describes physical results which may arise as result of vibration transmitted by operation of machinery in industrial plant.

W

WAGES

Family-Wage System. "Family-Wage" System in Germany and Certain Other European Countries, Mary T. Waggaman. Monthly Labor Rev., vol. 18, no. 1, Jan. 1924, pp. 20–29. Methods of payment; labor's attitude on family wages.

WEIGHING MACHINES

Automatic. Weighing in Bulk, S. H. Johnson, Indus. Management (Lond.), vol. 10, no. 13, Dec. 2, 1923, and vol. 11, nos. 1 and 2, Jan. 10 and 24, 1924, pp. 366–370, 22–26 and 54–55, 9 figs. Historical review of automatic weighing machines; principles of automatic weighing machine and description of different types; methods of compensation; dust protection; etc.

WEIGHTS AND MEASURES

Inch and Millimeter, Relation between. The Relation between Inches and Millimeters—Discussion, C. C. Stutz. Am. Mach., vol. 60, no. 4, Jan. 24, 1924, pp. 145–146. Discusses article by H. W. Bearce published in previous issue of same journal.

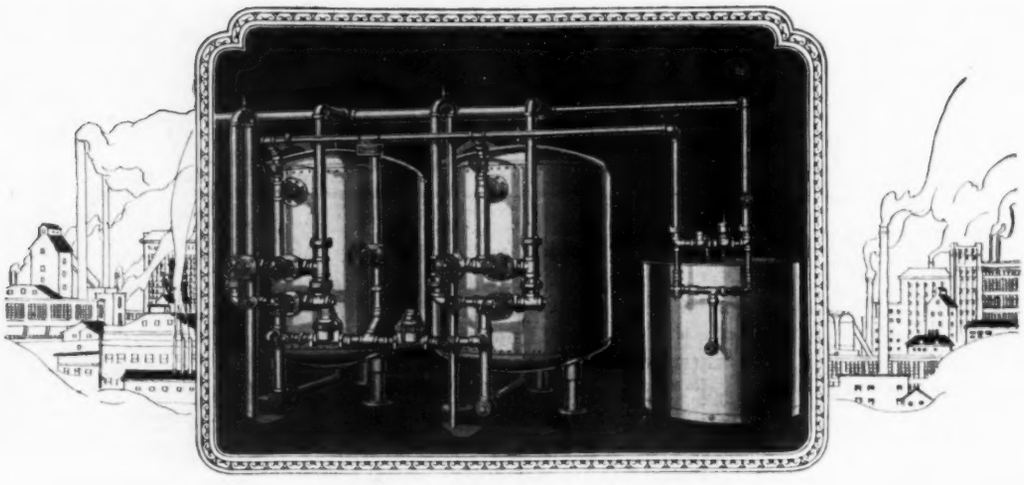
WELDING

Electric. See ELECTRIC WELDING; ELECTRIC WELDING, ARC.

Oxy-Acetylene. See OXY-ACETYLENE WELDING.

WIND MOTORS

Control Methods. A New Control Method for Wind Motors (Ein neues Regelverfahren für Windkraftwerke), R. Bosselmann. Zeit. des Vereines deutscher Ingenieure, vol. 68, no. 3, Jan. 19, 1924, pp. 48–52, 10 figs. Describes two methods of control; one indicating most favorable vane speed for prevailing velocity of wind and making possible the use of dynamos for uniform number of revolutions; the other automatically regulates voltage of system, and does away with battery switch operation and all switchboard attendance.



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THE ENGINEERING INDEX

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(See also page 308 of this issue for supplementary items.)

ABRASIVE WHEELS

Preparation for Polishing. Preparing Wheels for Polishing, F. D. Bowman. Iron Trade Rev., vol. 74, no. 12, Mar. 20, 1924, pp. 796–797, 3 figs. Various grades should be used depending upon finish desired on work; properties and preparation of glue, application of abrasive, setting, temperature and storage are factors in wheel effectiveness.

Selection and Uses. Grinding for Quick Repetition, W. Wilson. Commonwealth Engr., vol. 11, nos. 4 and 5, Nov. 1 and Dec. 1, 1923, pp. 148–150 and 183–185, 4 figs. Discusses grinding wheels, including rating, selection for work, lubrication, speeds, mounting, and uses; drill grinding.

ABRASIVES

Papers and Cloths. Finishing with Abrasive Paper, John M. Cook. Iron Trade Rev., vol. 74, no. 9, Feb. 28, 1924, pp. 613–615, 13 figs. Methods employed in making abrasive paper and cloth.

ACCOUNTING

Installation of Systems. Some Problems in the Installation of Accounting Systems, Wm. A. Ullrich. Jl. Accountancy, vol. 37, no. 3, Mar. 1924, pp. 193–201. Discusses problems showing how ingenuity of accountant is taxed to find new ways to solve difficulties which present themselves.

Public-Utility. Unit Plan of Accounting for Public Utilities, H. J. Johnson. Am. Gas Assn. Monthly, vol. 6, no. 3, Mar. 1924, pp. 147–153, 9 figs. Describes system which is a modification of plan known as "bookkeeping without books;" is exceedingly rapid in its operation as well as 100 per cent complete and is designed to meet most exacting requirements.

AIR COMPRESSORS

Angle Compound. An Angle Compound Air Compressor. Engineer, vol. 137, no. 3557, Feb. 29, 1924, pp. 224–225, 5 figs. New type of air compressor, manufactured by Sullivan Machy. Co., London, cylinders of which are set at right angles in horizontal and vertical positions, round single crank; engine is of uniflow class, but has valves to control exhaust.

Electric Motors for. The Application of A. C. Polyphase Motors to the Drive of Piston Air Compressors (Remarques sur l'application des moteurs électriques à courants alternatifs polyphasés à la commande de compresseurs d'air à pistons), A. Barjou. Revue Générale de l'Electricité, vol. 15, no. 5, Feb. 2, 1924, pp. 167–173, 6 figs. Based on study of function of compressors of constant speed, author concludes that only self-starting synchronous and asynchronous induction motors are suitable for drive of such compressors, and in most cases, former is preferable.

Pulsations Due to Synchronous-Motor Drives. Pulsations Due to Synchronous Motor Drives, Q. Graham. Power Plant Eng., vol. 28, no. 6, Mar. 15, 1924, pp. 342–344, 4 figs. Use of synchronous motors for driving compressors may cause severe pulsations in power on line supplying motors; cause and effects of pulsations.

AIR PUMPS

Water- vs. Steam-Jet. Water- vs. Steam-Jet Air Pumps (Wasserstrahl- oder Dampfstrahlluftpumpe?), S. v. Le Juge. Wärme, vol. 47, no. 3, Jan. 18, 1924, pp. 21–23, 2 figs. It is shown by comparison that the steam-jet pump, because of inadequate sub-cooling of mixture, delivers a much poorer vacuum with same steam consumption than a water-jet air pump, as constructed by H. P. Müller.

AIRPLANE ENGINES

Compression Pressure, Increasing. Increasing the Compression Pressure in an Engine by Using a Long Intake Pipe, R. Matthews and A. W. Gardiner. Nat. Advisory Committee for Aeronautics—Tech. Notes, no. 150, Feb. 1924, 9 pp., 5 figs. Investigation covering engine speeds between 500 and 1800 r.p.m.; data obtained are included in form of curves.

Design. Airplane-Engine Designing for Reliability, Geo. J. Mead. Soc. Automotive Engrs.—Jl., vol. 14, no. 3, Mar. 1924, pp. 277–285, 13 figs. Recent performances; lessons learned from duration testing; design of connecting rod; defects developed by duration running; Wright T-3 engine; application of experience to future design; development, production and operation of design.

French Types. Some French Light 'Plane Engines. Flight, vol. 16, no. 8, Feb. 21, 1924, pp. 104–106, 7 figs. Principal characteristics and features of Anzani 2-cylinder, Clerget-Renault 2-A 2-cylinder, Gnome-Rhone 2-cylinder, Salmson A.D.-3 3-cylinder, Sergant 4-cylinder, and Vaslin 4-cylinder engines.

1000-Hp. Progress Toward 1000 Hp. Aircraft Engines, G. D. Angle. Aviation, vol. 16, no. 8, Feb. 25, 1924, pp. 198–200, 2 figs. Advantages of single engine; Rolls-Royce Condor; Fiat A14 engine; big engines in France; 1000-hp. Lorraine-Dietrich; Napier cub; American developments; Air Service W1A engine.

Specifications. Aircraft Engine Specifications. Automotive Industries, vol. 50, no. 8, Feb. 21, 1924, p. 463. American and British specifications.

Water-Cooled. Water-Cooled Aero Engines, A. J. Rowledge. Automobile Engr., vol. 14, no. 186, Feb. 1924, pp. 50–54, 12 figs. Consideration of design; cooling system; cylinder construction; crankshafts; lubrication; engine suspension; gearing.

AIRPLANES

Commercial. The "Feiro I" Commercial Monoplane. Flight, vol. 16, no. 7, Feb. 14, 1924, pp. 86–87, 3 figs. First Hungarian machine; strut-braced monoplane with wing resting on top of fuselage; 120-hp. Le Rhône rotary engine; span 46 ft. 9 in., length 28 ft. 11 in., chord 6 ft. 7 in., wing area 280 sq. ft.

Construction. Building Government Airplanes, F. G. Steinbach. Iron Trade Rev., vol. 74, no. 10, Mar. 6, 1924, pp. 665–670 and 673, 11 figs. Difficulties encountered; fabrication of aluminum alloys important phase of construction; seasoned organization essential. Methods employed at plant of Glenn L. Martin Co., Cleveland.

Gliders. The Magnan Monoplane Glider. Aviation, vol. 16, no. 10, Mar. 10, 1924, pp. 257–258, 1 fig. French machine designed for gust-soaring; design based on bird flight.

Induced Drag. Induced Drag of Multiplanes, L. Prandtl. Nat. Advisory Committee for Aeronautics—Tech. Notes, no. 182, Mar. 1924, 22 pp., 8 figs. Calculation is based upon assumption that lift on wings is distributed along wing in proportion to ordinates of semi-ellipse; formulas and numerical tables are given for calculating drag; most favorable arrangements of biplanes and triplanes are discussed and results are further elucidated by means of numerical examples. Translated from Technische Berichte, vol. 3, no. 7.

Klemperer-Aachen. An Interesting German Light Monoplane, A. Martens. Flight, vol. 16, no. 8, Feb. 21, 1924, p. 108, 1 fig. Principal details of Klemperer-Aachen, having 2-cylinder air-cooled Siemens engine with rated power of 5–11 hp.; length overall 14 ft. 9 in., span 42 ft. 8 in., height 5 ft. 11 in., wing area 161.5 sq. ft., speed 43.6 m.p.h.

Manless. Automatically Piloted Airplane and Guidance by Radiotelegraphy (L'avion automatique et la direction des avions par T.S.F.), P. Hémardinquer. Nature (Paris), no. 2598, Jan. 19, 1924, pp. 39–43, 9 figs. Study of practical devices employed by M. Percheron and his co-workers which brought about good results obtained in tests at Etampes.

Models, Pressure Distribution on. Investigation of the Distribution of Pressure on the Body of an Airplane Model (Onderzoek van de drukverdeeling op den romp van een vliegtuigmodel). Ingenieur, vol. 39, no. 4, Jan. 26, 1924, pp. 58–63, 9 figs. Pressure is measured at various points of model by means of sensitive micrometer; results plotted in diagrams.

Seaplanes. See SEAPLANES.

Specifications. Airplane Specifications. Automotive Industries, vol. 50, no. 8, Feb. 21, 1924, pp. 458–462. Specifications for American and foreign airplanes.

Swallow. The 1924 Swallow Commercial Three-Seater. Aviation, vol. 16, no. 7, Feb. 18, 1924, p. 179, 1 fig. Machine is equipped with Curtis OX5 engine and has desirable commercial features such as small dimensions, ease of control, low initial cost and very low maintenance cost.

Swanson-Freeman. The Swanson-Freeman "SS 4" Two-Seater Biplane. Flight, vol. 16, no. 9, Feb. 28, 1924, p. 116, 1 fig. Principal data and dimensions: length 21 ft. 7 in., height 8 ft. 6 in., span 28 ft., chord 4 ft. 4 in.; 80-hp. Le Rhone engine.

Training. Success of Boeing Naval Training Plane. Aviation, vol. 16, no. 10, Mar. 10, 1924, p. 261, 1 fig. New Wright-engined plane of 200 hp. which won Navy's training-plane competition at Pensacola naval air station.

Vortices and Airfoil Lift. Note on Vortices and on Their Relation to the Lift of Airfoils, M. M. Munk. Nat. Advisory Committee for Aeronautics—Tech. Notes, no. 184, Mar. 1924, 15 pp., 2 figs. Discusses meaning of vortices, so often mentioned in connection with creation of lift by wings; action of wings can be more easily understood without use of vortices.

Wings. Interference of Multiplane Wings Having Elliptical Lift Distribution, H. von Sanden. Nat. Advisory Committee for Aeronautics—Tech. Notes, no. 181, Feb. 1924, 3 pp. Examination as to whether calculation of mutual induction or interference of two-wing surfaces are substantially altered by assuming elliptical instead of uniform lift distribution. Translated from Technische Berichte, vol. 3, no. 7.

AIRSHIPS

Shenendoah. Rigid Airships—United States Ship "Shenandoah," H. T. Bartlett. U. S. Naval Inst. Proc., vol. 50, no. 2, Feb. 1924, pp. 161–172, 3 figs. Description of the Shenandoah; length 680 ft., diameter 78.7 ft., height 96 ft., gas capacity 2,150,000 cu. ft., deadweight about 74,000 lb., speed about 60 m.p.h.

ALLOYS

Aluminum. See ALUMINUM ALLOYS.

Cadmium-Lead-Zinc. The Cadmium-Lead-Zinc System, M. Cook. Inst. Metals—advance paper, no. 3, for meeting Mar. 12–13, 1924, 17 pp., 10 figs. Numbering of alloys; preparation of alloys and thermal method; liquidus surface; solidus; binary eutectics; region of partial miscibility; microscopic examination.

Copper. See COPPER ALLOYS.

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NOTE.—The abbreviations used in indexing are as follows:

Academy (Acad.)
American (Am.)
Associated (Assoc.)
Association (Assn.)
Bulletin (Bul.)
Bureau (Bur.)
Canadian (Can.)
Chemical or Chemistry (Chem.)
Electrical or Electric (Elec.)
Electrician (Elecn.)
Engineer[s] (Engr.[s])
Engineering (Eng.)
Gazette (Gaz.)
General (Gen.)
Geological (Geol.)
Heating (Heat.)
Industrial (Indus.)
Institute (Inst.)
Institution (Instn.)
International (Int.)
Journal (Jl.)
London (Lond.)
Machinery (Machy.)
Machinist (Mach.)
Magazine (Mag.)
Marine (Mar.)
Materials (Matls.)
Mechanical (Mech.)
Metallurgical (Met.)
Mining (Min.)
Municipal (Mun.)
National (Nat.)
New England (N. E.)
Proceedings (Proc.)
Record (Rec.)
Refrigerating (Refrig.)
Review (Rev.)
Railway (Ry.)
Scientific or Science (Sci.)
Society (Soc.)
State names (Ill., Minn., etc.)
Supplement (Supp.)
Transactions (Trans.)
United States (U. S.)
Ventilating (Vent.)
Western (West.)

Classified List of Mechanical Equipment

Manufactured by Firms Represented in MECHANICAL ENGINEERING

FOR ALPHABETICAL LIST OF ADVERTISERS, SEE PAGE 174

Accumulators, Hydraulic
Farrel Foundry & Machine Co.
Mackintosh-Hemphill Co.
* Worthington Pump & Mchry. Corpn

Aftercoolers, Air
* Ingersoll-Rand Co.

Agitators
Hill Clutch Machine & Fdry. Co.

Air Compressors, Receivers, etc.
(See Compressors, Receivers, etc., Air)

Air Conditioning Apparatus
* American Blower Co.
* Carrier Engineering Corp'n
* Clarage Fan Co.
* Sturtevant, B. F. Co.

Air-Jet Lifts
* Schutte & Koerting Co.

Air Washers
* American Blower Co.
* Carrier Engineering Corp'n
* Clarage Fan Co.
* Cooling Tower Co. (Inc.)
* Spray Engineering Co.
* Sturtevant, B. F. Co.

Alloys
Driver-Harris Co.

Alloys (Calite)
Calorizing Co.

Ammeters
* Bristol Co.
* General Electric Co.
* Westinghouse Electric & Mfg. Co.

Anemometers
* Taylor Instrument Cos.
Weber, F. Co. (Inc.)

Annealing
* American Metal Treatment Co.

Arbors
* Cleveland Twist Drill Co.

Arc Welding Equipment
* Westinghouse Elect. & Mfg. Co.

Arches, Boiler Furnace
* McLeod & Henry Co.
* Titusville Iron Works Co.

Arches, Fire Door
* McLeod & Henry Co.

Arches, Ignition (Flat Suspended)
* Combustion Engineering Corp'n
* McLeod & Henry Co.

Asbestos Products
Carey, Philip Co.
Garlock Packing Co.
Johns-Manville (Inc.)

Ash Handling Equipment
Baker Dunbar Co.

Autoclaves
Farrel Foundry & Machine Co.

Babbitt Metal
* Medart Co.
* Westinghouse Elect. & Mfg. Co.

Ball Bearings, Gages, etc.
(See Bearings, Gages, Ball)

Balls, Brass and Bronze
* Atlas Ball Co.
* Gwilliam Co.

Balls, Steel
* Atlas Ball Co.
* Gwilliam Co.
* New Departure Mfg. Co.
* S K F Industries (Inc.)

Barometers
* American Schaeffer & Budenberg Corp'n
* Taylor Instrument Cos.

Barometers, Mercurial
* Tagliabue, C. J. Mfg. Co.

Bearings, Ball
Fafnir Bearing Co.
* Gwilliam Co.
Marlin-Rockwell Corp'n
* New Departure Mfg. Co.
* Norma Co. of America
* S K F Industries (Inc.)
* Strom Ball Bearing Mfg. Co.

Bearings, Radial Thrust
* New Departure Mfg. Co.

Bearings, Roller
* Gwilliam Co.
* Hyatt Roller Bearing Co.
* Norma Co. of America
* Royersford Fdry. & Mach. Co.
* Timken Roller Bearing Co.

Bearings, Self-Oiling
* Brown, A. & F. Co.
* Doehler Die-Casting Co.
* Falls Clutch & Machinery Co.
Hill Clutch Machine & Fdry. Co.
* Jones, W. A. Fdry. & Mach. Co.
Link-Belt Co.
* Royersford Fdry. & Mach. Co.
* Wood's, T. B. Sons Co.

Bearings, Tapered
* Timken Roller Bearing Co.

Bearings, Thrust
Fafnir Bearing Co.
* General Electric Co.
* Gwilliam Co.
Hill Clutch Machine & Fdry. Co.
* Norma Co. of America
* S K F Industries (Inc.)
* Timken Roller Bearing Co.
* Strom Ball Bearing Mfg. Co.

Belt Dressing
* Dixon, Joseph Crucible Co.
Gandy Belting Co.

Belt Lacing, Steel
* Bristol Co.

Belt Tighteners
* Brown, A. & F. Co.
Hill Clutch Machine & Fdry. Co.
* Jones, W. A. Fdry. & Mach. Co.
Link-Belt Co.
* Medart Co.
* Smidth, F. L. & Co.
* Wood's, T. B. Sons Co.

Belting, Canvas (Stitched)
Gandy Belting Co.
* United States Rubber Co.

Belting, Conveyor
Gandy Belting Co.
* Goodrich, B. F. Rubber Co.
* United States Rubber Co.

Belting, Elevator
Gandy Belting Co.
* Goodrich, B. F. Rubber Co.
* United States Rubber Co.

Belting, Endless
Gandy Belting Co.

Belting Fabric
Gandy Belting Co.

Belting, Leather
American Sole & Belting Leather Tanners (Inc.)

Belting, Rubber
* Goodrich, B. F. Rubber Co.
* United States Rubber Co.

Belting, Waterproof
Gandy Belting Co.

Bending & Straightening Machines
* Long & Allstatter Co.

Bends, Pipe
* Frick Co. (Inc)
* Vogt, Henry Machine Co.

Billets, Steel
* Timken Roller Bearing Co.

Blocks, Tackle
Clyde Iron Work Sales Co.
* Roebling's, John A. Sons Co.

Blowers, Centrifugal
* American Blower Co.
* Clarage Fan Co.
* Coppus Engineering Corp'n
* De Laval Steam Turbine Co.
* General Electric Co.
* Ingersoll-Rand Co.
* Kerr Turbine Co.
* Sturtevant, B. F. Co.
* Westinghouse Electric & Mfg. Co.

Blowers, Fan
* American Blower Co.
* Clarage Fan Co.
* Coppus Engineering Corp'n
* Greek Fuel Economizer Co.
* Sturtevant, B. F. Co.

Blowers, Forge
* American Blower Co.
* Sturtevant, B. F. Co.

Blowers, Pressure
* American Blower Co.
* Clarage Fan Co.
Lammert & Mann Co.
* Sturtevant, B. F. Co.

Blowers, Rotary
Fletcher Works
Lammert & Mann Co.
* Schutte & Koerting Co.
* Sturtevant, B. F. Co.

Blowers, Soot
Diamond Power Specialty Corp'n
* Sturtevant, B. F. Co.

Blowers, Steam Jet
* Schutte & Koerting Co.

Blowers, Turbine
* Coppus Engineering Corp'n
* Sturtevant, B. F. Co.

Blueing (Metal)
* American Metal Treatment Co.

Boards, Drawing
Dietzgen, Eugene Co.
Keuffel & Esser Co.
New York Blue Print Paper Co.
ParVell Laboratories
U. S. Blue Co.
Weber, F. Co. (Inc.)

Boiler Baffles
* King Refractories Co. (Inc.)
* McLeod & Henry Co.

Boiler Compounds
* Dixon, Joseph Crucible Co.
Unisol Mfg. Co.

Boiler Coverings, Furnaces, Tube Cleaners, etc.
(See Coverings, Furnaces, Tube Cleaners, etc., Boiler)

Boiler Fronts
* O'Brien, John Boiler Works Co.
* Titusville Iron Works Co.

Boiler Settings, Steel Cased
* Casey-Hedges Co.
* McLeod & Henry Co.
* O'Brien, John Boiler Works Co.
* Vogt, Henry Machine Co.
* Walsh & Weidner Boiler Co.

Boilers, Heating
* Casey-Hedges Co.
* Erie City Iron Works
* Keeler, E. Co.
* Leffel, James & Co.
Lidgerwood Mfg. Co.
* O'Brien, John Boiler Works Co.
* Titusville Iron Works Co.
* Union Iron Works
* Walsh & Weidner Boiler Co.

Boilers, Locomotive
* Casey-Hedges Co.
* Keeler, E. Co.
* Leffel, James & Co.
* Titusville Iron Works Co.
* Union Iron Works
* Walsh & Weidner Boiler Co.

Boilers, Marine (Scotch)
Bethlehem Shipbldg.Corp'n(Ltd.)
* Casey-Hedges Co.
* Leffel, James & Co.
* Titusville Iron Works Co.
* Walsh & Weidner Boiler Co.

Boilers, Marine (Water Tube)
* Babcock & Wilcox Co.
Bethlehem Shipbldg.Corp'n(Ltd.)
* Casey-Hedges Co.
* Connelly, D. Boiler Co.
* O'Brien, John Boiler Works Co
* Springfield Boiler Co.
* Titusville Iron Works Co.
* Walsh & Weidner Boiler Co.
* Ward, Charles Engineering Wks.

Boilers, Portable
* Casey-Hedges Co.
* Erie City Iron Works
* Frick Co. (Inc.)
* Keeler, E. Co.
* Leffel, James & Co.
Lidgerwood Mfg. Co.
* O'Brien, John Boiler Works Co.
* Titusville Iron Works Co.
* Union Iron Works
* Walsh & Weidner Boiler Co.

Boilers, Tubular (Horizontal Return)
* Bigelow Co.
* Casey-Hedges Co.
* Cole, R. D. Mfg. Co.
* Connelly, D. Boiler Co.
* Erie City Iron Works
* Keeler, E. Co.
* Leffel, James & Co.
Lidgerwood Mfg. Co
Morrison Boiler Co.
* O'Brien, John Boiler Works Co.
* Titusville Iron Works Co
* Union Iron Works.
* Vogt, Henry Machine Co.
* Walsh & Weidner Boiler Co.
* Ward, Charles Engineering Wks.
* Webster, Howard J.
* Wickes Boiler Co.

Boilers, Tubular (Vertical Fire)
* Bigelow Co.
* Casey-Hedges Co.
Clyde Iron Works Sales Co.
* Keeler, E. Co.
* Leffel, James & Co.
Lidgerwood Mfg. Co
Morrison Boiler Co.
* O'Brien, John Boiler Works Co.
* Titusville Iron Works Co.
* Union Iron Works
* Walsh & Weidner Boiler Co.

Boilers, Water Tube (Horizontal)
* Babcock & Wilcox Co.
Bethlehem Shipbldg.Corp'n(Ltd.)
* Casey-Hedges Co
* Cole, R. D. Mfg. Co.
* Connelly, D. Boiler Co.
* Edge Moor Iron Co.
* Erie City Iron Works
* Keeler, E. Co.
* Ladd, George T. Co.
Morrison Boiler Co.
* O'Brien, John Boiler Works Co.
* Springfield Boiler Co.
* Union Iron Works
* Vogt, Henry Machine Co.
* Walsh & Weidner Boiler Co.
* Wickes Boiler Co.

Boilers, Water Tube (Inclined)
* Babcock & Wilcox Co.
Bethlehem Shipbldg.Corp'n(Ltd.)
* Bigelow Co.
* Casey-Hedges Co.
* Keeler, E. Co.
* Ladd, George T. Co.
Morrison Boiler Co.
* O'Brien, John Boiler Works Co.
* Vogt, Henry Machine Co.
* Walsh & Weidner Boiler Co.
* Ward, Charles Engineering Wks.

Boilers, Water Tube (Vertical)
* Babcock & Wilcox Co.
* Bigelow Co.
* Casey-Hedges Co.
* Erie City Iron Works
* Keeler, E. Co.
* Ladd, George T. Co.
Morrison Boiler Co.
* O'Brien, John Boiler Works Co.
* Walsh & Weidner Boiler Co.
* Wickes Boiler Co.

Bolts
* National Acme Co.

Boring and Drilling Machines
Universal Boring Machine Co.

Boring Drilling and Milling Machines (Horizontally Combined)
Universal Boring Machine Co.

Boxes, Carbonizing
Driver-Harris Co.

Boxes, Case Hardening
Driver-Harris Co.

Boxes, Water Service
Murdock Mfg. & Supply Co.

Brake Blocks
Johns-Manville (Inc.)

Brakes, Air
* Allis-Chalmers Mfg. Co.
* General Electric Co.

Brass Goods
* Scovill Mfg. Co.

Brass Mill Machinery
Farrel Foundry & Machine Co.

Breechings, Smoke
Morrison Boiler Co.
* Titusville Iron Works Co.
* Vogt, Henry Machine Co.

Brick, Fire
* Bernitz Furnace Appliance Co.
* Celite Products Co.
* Drake Non-Clinkering Furnace Block Co.
Keystone Refractories Co.
* King Refractories Co. (Inc.)
* McLeod & Henry Co.
Maphite Sales Corp'n

Brick, Insulating
* Celite Products Co.
* Quigley Furnace Specialties Co.

Bridges, Coal & Ore Handling
* Brown Hoisting Machinery Co.
Link-Belt Co.
McMyler-Interstate Co.

Bridgewalls (Furnace)
* McLeod & Henry Co.

Buckets, Bottom Discharge
Atlas Car & Mfg. Co.

Buckets, Clam Shell
McMyler-Interstate Co.

*Catalogue data of firms marked * appear in the A.S.M.E. Condensed Catalogues of Mechanical Equipment, 1923-24 Volume*

Ferro-. See FERROALLOYS.

Non-Ferrous. The Practical Value of Modern Non-Ferrous Alloys, S. F. Barclay. Foundry Trade Jl., vol. 29, no. 389, Jan. 31, 1924, pp. 85–87, 1 fig. Shows that if founder is to give best service to his customers he needs to know exact use to which his castings will be put, so that he can bring out relevant quality in highest degrees; discusses different alloys.

ALUMINUM

Die Casting. Die-Casting Aluminum, S. Swan. Metal Industry (Lond.), vol. 24, no. 6, Feb. 8, 1924, p. 123. Chief practical precautions that must be taken for successful casting of aluminum in permanent molds.

Tensile Strength. The Tensile Properties of Aluminium at High Temperatures, Thos. Martin. Inst. Metals—advance paper, no. 10, for meeting Mar. 12-13, 1924, 32 pp., 18 pp. Examination of tensile strength at all temperatures up to neighborhood of melting point of metal in its fully annealed state; test on commercial metal; comparison of results with those for pure metal; practical significance of results.

ALUMINUM ALLOYS

Aluminum-Copper. The Aluminium-Copper Alloys. Alloys of Intermediate Composition, D. Stockdale. Inst. Metals—advance paper, no. 13, for meeting Mar. 12–13, 1924, 16 pp., 4 figs. Study of alloys by thermal and photomicrographic methods; results show that their behavior is even more complex than has been thought, and it is probable that diagram here put forward is only approximately correct.

Duralumin. See DURALUMIN.

ANEMOMETERS

Hot-Wire. The Measurement of Air Flow, R. O. King. Engineering, vol. 117, nos. 3031 and 3034, Feb. 1 and 22, 1924, pp. 136–137 and 249–251, 9 figs. The Callendar hot-wire anemometer, its arrangement for practical use in air measurement, calibration, and comparison with other methods from experimental results.

Maximum-Wind-Intensity. A Simple Anemometer for Determining Maximum Intensity of Wind (Un anémometre à maximum simple), P. L. Mercanton. Nature (Paris), no. 2601, Feb. 23, 1924, pp. 124–126, 2 figs. Describes instrument developed by author.

ARTILLERY

Recoil Mechanisms. Advantages of Hydro-Pneumatic Recoil Mechanism, D. A. Gurney and W. C. Young. Army Ordnance, vol. 4, no. 22, Jan.-Feb. 1924, pp. 230–233, 3 figs. Greater range and less weight required; standardization; manufacture; service use.

AUTOGENOUS WELDING

Coal-Gas. Welding with Coal Gas (Schweissungen im Leuchtgasfeuer), Fr. Messinger. Wärme, vol. 47, no. 4, Jan. 25, 1924, pp. 31–32, 6 figs. Autogenous welding and cutting; success of complete welds by means of coal gas without welding medium; welding tests to determine welding limit; experiences with welds in coal-gas fire; tests with low-pressure gas, compressed air and compressed gas.

AUTOMOBILE ENGINES

Assembling Fixture. Special Fixture Used in Assembling Packard Cylinder Block to Crankcase. Automotive Industries, vol. 50, no. 10, Mar. 6, 1924, pp. 564–565, 3 figs. Preserves alignment standards of connecting rods, pistons, and rings previously installed; device is operated pneumatically and, by simplifying work, makes possible more rapid production.

Bagnule. Will Surface-ignition Solve Automobile Oil-engine Problems? Oil Engine Power, vol. 2, no. 2, Feb. 1924, pp. 76–78, 2 figs. Describes Bagnule heavy-oil hot-bulb type of surface-ignition automobile engine; invented by an Italian, and sponsored by Siemens-Schuckert Werke and Allemeine Elektricitaets Gesellschaft of Berlin; requires only 20 lb. air per lb. of fuel, weighs only 18 lb. per b.hp., and regularly consumes 29 deg. B. fuel oil without coking up bulb and at rate of 0.58 lb. b.hp.hr.

Balancer. The Harmonic Balancer, J. N. Morris. Autocar, vol. 52, no. 1478, Feb. 15, 1924, pp. 283–284, 8 figs. Description of device originally introduced by F. W. Lanchester for obtaining, in a 4-cylinder engine of orthodox type, perfection of balance attainable in a 6-cylinder engine, and its action.

Carburetors. See CARBURETORS.

Crankcase-Oil Dilution. Dilution of the Crank Case Oil of Automotive Engines, C. M. Larson. Armour Engr., vol. 15, no. 2, Jan. 1924, pp. 53–54 and 63, 6 figs. Causes and prevention; results of tests; describes Dilut-O-Meter, and Vis-Gage, instruments for testing life of crankcase oil.

The Serious Evils of Crankcase-Oil Dilution, W. F. Parish. Automotive Mfr., vol. 65, no. 11, Feb. 1924, pp. 24–25. Effect of dilution on wear of motor-vehicle engines; statistics of recent replacements; practical improvements in methods; preventing contamination. Abstract of paper read before Automotive Service Assn.

Detonation, Control of. Control of Detonation, G. A. Young and J. H. Holloway. Soc. Automotive Engrs.—Jl., vol. 14, no. 3, Mar. 1924, pp. 315–318. Discusses methods of controlling temperature of charge before and after mixture enters combustion chamber, and before normal ignition occurs; results of tests are that, when care is exercised in maintaining mixture, spark plugs, valves and combustion chamber at proper temperature, compression pressure of 125 lb. per sq. in. can be used without detonation by addition of small amount of anti-knock compound to fuel with enough increase in efficiency of engine to warrant additional expense.

Lubricants, Frictional Losses Due to. Engines for Oil versus Oil for Engines. Soc. Automotive Engrs.—Jl., vol. 14, no. 3, Mar. 1924, pp. 307–314, 2 figs. Contains following articles: Mechanical Friction as Affected by the Lubricant, L. H. Pomeroy; The Function of Lubricants, A. L. Clayden.

Manufacture. Unusual Tool Grouping Lowers Cost of Nash Engine Production. Automotive Industries, vol. 50, no. 10, Mar. 6, 1924, pp. 559–563, 14 figs. Extra operations resulting in superior finish are made possible on this account; many special machines are employed; cylinders are bored three times, reamed once and honed; 600 blocks can be completed without renewing stones.

Stock, Specifications for. American Stock Engine Specifications. Automotive Industries, vol. 50, no. 8, Feb. 21, 1924, pp. 442–445. Tabular data.

AUTOMOBILE FUELS

Production from Solid Fuels. The Bergius Process. Motor Transport (Lond.), vol. 38, no. 990, Feb. 18, 1924, pp. 183–184, 1 fig. Principle of newly developed method of oil-distillate production from solid fuels.

Volatility. Economic Motor-Fuel Volatility, R. Birdsell. Soc. Automotive Engrs.—Jl., vol. 14, no. 3, Mar. 1924, pp. 267–273, 9 figs. Results obtained from acceleration tests made on road and in laboratory, to determine whether rates of acceleration obtainable at any given temperature are different for fuels compared, and whether, when carburetor settings are such as to give maximum acceleration with each fuel, fuel consumption under constant speed and load conditions will be greater with one fuel than with other. Appendix contains analytical description by W. S. James of design of disk used to simulate inertia of car.

AUTOMOBILE INDUSTRY

Standardization. Tentative Standardization Work. Soc. Automotive Engrs.—Jl., vol. 14, no. 3, Mar. 1924, pp. 338–341. Color code for cable proposed; wire-cloth standard revision; bolt and nut standardization; sheet-steel problems; revision of tube fittings. Reports of Standards Committee of S. A. E.

AUTOMOBILE MANUFACTURING PLANTS

Oil-Fuel Burning. Burning Oil Fuel in a Ford Motor Co. Plant, A. Murphy. Power House, vol. 17, no. 4, Feb. 20, 1924, pp. 20–21 and 38, 4 figs. Oil-burning forced-circulation hot-water-type heating system installed; high-pressure steam provides source of heat for drying ovens.

AUTOMOBILES

Axles. New Columbia Axles Designed for Use with Four-Wheel Brakes. Automotive Industries, vol. 50, no. 9, Feb. 28, 1924, pp. 508–509, 2 figs. Steering knuckle is reversed Elliott type and is formed with circular flange to which brake cover plate is secured by six rivets; feature of rear axle is one-piece gear carrier.

Bentley. The Three-Litre Bentley. Auto-Motor Jl., vol. 29, no. 7, Feb. 14, 1924, pp. 137–140, 13 figs. Mechanical details, and equipment. Two inlet and two exhaust valves arranged in each cylinder; 4-cylinder engine of monobloc construction; cylinder bore 80 mm. and piston stroke 149 mm., carrying an R. A. C. rating of 15.9 hp., and capable of propelling standard model vehicle at 75 m.p.h.

Body Repairs. Fisher System Places Body Repairs on Par with Chassis Service, W. L. Carver. Automotive Industries, vol. 50, no. 10, Mar. 6, 1924, pp. 572–574, 1 fig. Units and bodies so numbered that replacements can be made on short notice; car distributors are supplied with parts books from which stocks are ordered.

Calthorpe. The 12–20 H.P. Calthorpe. Auto-Motor Jl., vol. 29, no. 5, Jan. 31, 1924, pp. 97–100, 11 figs. Complete description; 4-cylinder engine; will develop 30 hp. at 3200 r.p.m.

Change Gears. Change Gear for Automobiles (Wechselgetriebe für Kraftwagen), v. Soden. Maschinenbau, vol. 3, no. 8, Jan. 24, 1924, pp. 200–203, 7 figs. Deals with number and stepping of gears.

Charcoal-Producer-Gas-Burning. Charcoal-Burning Automobiles (L'Automobile à charbon de bois), A. Troller. Nature (Paris), no. 2601, Feb. 9, 1924, pp. 94–96, 4 figs. Describes Berliet system of using charcoal producer gas for automobiles and motor trucks; shows Berliet car equipped with gas producer which is placed in rear and does not alter general appearance of car.

Chassis, Experimental. A Novel Experimental Chassis. Automobile Engr., vol. 14, no. 186, Feb. 1924, p. 45, 2 figs. Complicated design embodying 4-wheel driving, steering and braking.

Chassis Lubricating System. Tecalemit. Auto-Motor Jl., vol. 29, no. 9, Feb. 28, 1924, p. 187, 1 fig. Description of a new high-pressure lubrication system for motor-vehicle chassis, introduced by Tecalemit, Ltd., Lond., Eng., consisting of a grease gun of special type and a special grease plug for parts to be lubricated; can be installed in all cases where usual type of screw-down grease lubricators have been used.

Darracq. The 12–23 H.P. Darracq. Auto-Motor Jl., vol. 29, no. 6, Feb. 7, 1924, pp. 117–120, 12 figs. Monobloc 4-cylindered engine; four-wheel brakes of simple design.

Delaunay-Belleville. The 15.9 H.P. Delaunay-Belleville. Auto-Motor Jl., vol 29, no. 9, Feb. 28, 1924, pp. 181–184, 10 figs. Description of French touring car, having 4-cylinder monobloc engine with 80-mm. bore and a crank throw of 130 mm.; wheelbase 10 ft. 6 in., total length 14 ft., track 4 ft. 8 in.

Electric, Specifications for. American Electric Car and Truck Specifications. Automotive Industries, vol. 50, no. 8, Feb. 21, 1924, pp. 422–423. Tables of statistics.

Essex. A Six-Cylinder Essex for 1924. Autocar vol. 52, no. 1477, Feb. 8, 1924, pp., 248–249, 7 figs. 16.5 hp. engine.

Hampton. The Hampton Car. Auto-Motor Jl., vol. 29, no. 8, Feb. 21, 1924, pp. 159–162, 11 figs. Describes two models of English car, one of 9–21 hp. and other of 11–35 hp., both similar in general design, both have monobloc 4-cylinder overhead valve engines and clutch and speed-gear integral with engine; 9–21-hp. model has 63-mm. bore and 100-mm. stroke, and 11-35-hp. model, 69-mm. bore and 120-mm. stroke.

Headlights. Elliptical Reflector in Egg-Shaped Casing Feature of New Headlamp. Automotive Industries, vol. 50, no. 9, Feb. 28, 1924, p. 520, 3 figs. Beam of light is deformed by lens to inverted fan-shaped section in new headlight brought out by Edmunds & Jones Co., Detroit, Mich.; upwardly diffused light, of amber hue, shows objects in road above lamp level but does not glare.

Manufacture. Building 80 Cars a Day in Toronto's Ford Plant, H. P. Armson. Can. Machy., vol. 31, nos. 7 and 8, Feb. 14 and 21, 1924, pp. 15–19 and 13–17, 6 figs. Description of progressive operations involved in assembling cars at new Danforth Ave. plant of Ford Motor Co. of Toronto, Can., and labor-saving devices used to aid production.

Riding-Comfort Factors. Riding-Comfort Factors. Soc. Automotive Engrs.—Jl., vol. 14, no. 3, Mar. 1924, pp. 335–337 and 341. Outline of factors involved in question of riding comfort and discussion thereof.

Starting and Lighting Equipment. Electric Starting and Lighting Equipment, A. C. Burgoine. Automobile Engr., vol. 14, no. 186, Feb. 1924, pp. 54–61, 19 figs. What a lighting set consists of; electric starter; standardization of equipment; dynamo drives and regulation; starter mounting and drives; dynamo-coil ignition; future developments.

AVIATION

Progress. Some Aspects of Aviation, Flight, vol. 16, no. 6, Feb. 7, 1924, pp. 78–79. General discussion on interesting aviation matters, including development of light airplanes in England and progress of aviation in United States. Paper read before Cambridge Univ. Aeronautical Soc.

Relation to Sea Power. Relation of Air Power to Sea Power, D. W. Knox. Aviation, vol. 16, no. 9, Mar. 3, 1924, pp. 225–227. Consideration of question as to whether aviation should be taken from cognizance and control of services and be formed into independent air force; air power vs. sea power; effectiveness of aircraft and operating range; accuracy of aerial bombing. Speech delivered to Dist. of Columbia Dept., Reserve Officers' Assn.

Wind Effect in. The Effects of Wind in Aviation (Les effects du vent, en aviation), A. Lainé. Génie Civil, vol. 84, no. 5, Feb. 2, 1924, pp. 112–113, 2 figs. Effects of wind on taking off and landing; effects of wind in flight; fog and storms; drag.

AXLES

Automobile, Machining. A British Method of Building Axles, A. J. Aiers. Am. Mach., vol. 60, no. 12, Mar. 20, 1924, pp. 421–423, 10 figs. Fixtures employed in machining malleable-iron axle housing for 11-hp. car; double-duty fixtures minimize chances for making errors.

B

BEARING METALS

Characteristics. Bearings and Characteristics of Bearing Metals, W. E. Biggs and W. R. Woolrich. Nat. Engr., vol. 28, no. 3, Mar. 1924, pp. 106–108. Composition and characteristics of different bearing metals; hints on proper procedure in babbitting bearings; points to be considered in selecting a bearing metal.

BEARINGS

Lubrication. The Proper Lubrication of Modern Industrial Bearings, A. F. Brewer. Indus. Mgt. (N. Y.), vol. 67, no. 3, Mar. 1924, pp. 177–183, 9 figs. Discusses characteristics and requirements of each type of bearing.

Motor, Selection of. Economies in Selection of Motor Bearings, A. C. Turtle. Ry. Elec. Engr., vol. 15, no. 3, Mar. 1924, pp. 88–91, 5 figs. Consideration of advantages of oil ring bearings and ball bearings; oiling considerations.

Sleeve. Some Ways to Cure Sleeve Bearing Troubles, R. Pruger. Indus. Engr., vol. 82, no. 3, Mar. 1924, pp. 113–117, 10 figs. Design and construction of motor sleeve bearings, their advantages, and improvements which have been made to overcome troubles that are sometimes encountered.

Tests. Bearing Tests (Lagerversuche), G. Meyer-Jagenberg. Werkstattstechnik, vol. 18, no. 3, Feb. 1, 1924, pp. 41–46, 27 figs. Gives proof of agreement between test results and theory; numerical dependence of bearing friction on working conditions; determination of most suitable oil and calculation of friction corresponding to given working conditions.

Waste-Packed. Waste-Packed Bearing Design and Operation, C. Bethel. Elec. Jl., vol. 21, no. 3, Mar. 1924, pp. 115–118, 4 figs. Information regarding oil flow and action of waste packing.

BEARINGS, ROLLER

Railway Cars. Comparison of Ball and Roller Bearings (Comparaison des paliers à billes et à rouleaux), A. Bijls. Génie Civil, vol. 84, no. 7, Feb. 16, 1924, pp. 159–161, 6 figs. Comparison of two systems in their application to railway rolling stock, showing advantages of roller bearings.

BEARINGS, THRUST

Michell. Thrust Blocks for the SS. "Empress of

Manufactured by Advertisers — CLASSIFIED LIST OF MECHANICAL EQUIPMENT — Alphabetical List on page 174

Buckets, Elevator
* Brown Hoisting Machinery Co.
Chain Belt Co.
* Gifford-Wood Co.
* Hendrick Mfg. Co.
* Jones, W. A. Fdry. & Mach. Co.
Link-Belt Co.

Buckets, Orange Peel
McMyler-Interstate Co.

Buckets, Grab
* Brown Hoisting Machinery Co.
Clyde Iron Works Sales Co.
Lidgerwood Mfg. Co.
Link-Belt Co.

Buckets, Self-Dumping
Atlas Car & Mfg. Co.
* Brown Hoisting Machinery Co.
Clyde Iron Works Sales Co.
Link-Belt Co.

Burners, Oil
Bethlehem Shipbldg.Corp'n(Ltd.)
* Combustion Engineering Corp'n
* Schutte & Koerting Co.
* Spray Engineering Co.

Burners, Powdered Fuel
Grindle Fuel Equipment Co.
* Quigley Furnace Specialties Co.

Bushings, Bronze
Hill Clutch Mach. & Fdry. Co.
* Wood's, T. B. Sons Co.

Cabinets and Tables, Blue Print Filing
Dietzgen, Eugene Co.
Economy Drawing Table & Mfg. Co.
Keuffel & Esser Co.
ParVell Laboratories
U. S. Blue Co.
Weber, F. Co. (Inc.)

Cableways, Excavating
Lidgerwood Mfg. Co.

Cableways, Hoisting and Conveying
Lidgerwood Mfg. Co.

Calorimeters
* American Schaeffer & Budenberg Corp'n
* Sarco Co. (Inc.)

Calorizing
Calorizing Co.

Cars, Charging
Atlas Car & Mfg. Co.
Easton Car & Construction Co.
* Whiting Corp'n

Cars, Dump
Atlas Car & Mfg. Co.

Cars, Industrial Railway
Easton Car & Construction Co.
Link-Belt Co.
* Whiting Corp'n

Cars, Mine
Atlas Car & Mfg. Co.

Cars, Platform
Atlas Car & Mfg. Co.

Cars, Trolley (Industrial Railway)
Link-Belt Co.

Casehardening
* American Metal Treatment Co.

Casings, Steel (Boiler)
* Casey-Hedges Co.
* Vogt, Henry Machine Co.
* Walsh & Weidner Boiler Co.

Castings, Acid Resistant
* U. S. Cast Iron Pipe & Fdry. Co.

Castings, Aluminum
Buffalo Bronze Die Casting Corp'n
DuPont Engineering Co.

Castings, Brass
* Croll-Reynolds Engineering Co.
Du Pont Engineering Co.
* Edward Valve & Mfg. Co.

Castings, Bronze
Buffalo Bronze Die Casting Corp'n

Castings, Die-Molded
* Doehler Die-Casting Co.
Veeder Mfg. Co.

Castings, Heavy
Farrel Foundry & Machine Co.
Hill Clutch Mach. & Fdry. Co.
* U. S. Cast Iron Pipe & Fdry. Co.

Castings, Iron
Bethlehem Shipbldg.Corp'n(Ltd.)
* Brown, A. & F. Co.
* Builders Iron Foundry
* Burhorn, Edwin Co.
* Casey-Hedges Co.
* Central Foundry Co.
Chain Belt Co.
* Cole, R. D. Mfg. Co.
* Croll-Reynolds Engineering Co.
DuPont Engineering Co.
* Falls Clutch & Machinery Co.
Farrel Foundry & Machine Co.
* Franklin Machine Co.
Garlock Packing Co.
* Harrisburg Fdry. & Mach. Wks.
Hill Clutch Machine & Fdry. Co.
* Jones, W. A. Fdry. & Mach. Co.
Lidgerwood Mfg. Co.
Link-Belt Co.
* Nordberg Mfg. Co.
* Pittsburgh Valve, Fdry. & Const. Co.
* Royersford Fdry. & Mach. Co.
Treadwell Engineering Co.
* U. S. Cast Iron Pipe & Fdry. Co.
* Vogt, Henry Machine Co.

Castings, Monel Metal
Driver-Harris Co., (In Canada)
* Edward Valve & Mfg. Co.

Castings, Nichrome
Driver-Harris Co.

Castings, Nickle Chromium
Driver-Harris Co.

Castings, Semi-Steel
* Builders Iron Foundry
Chain Belt Co.
* Croll-Reynolds Engrg. Co. (Inc.)
Farrel Foundry & Machine Co.
Hill Clutch Machine & Fdry. Co.
Link-Belt Co.
* Nordberg Mfg. Co.
* Vogt, Henry Machine Co.

Castings, Steel
* Falk Corporation
Link-Belt Co.
Mackintosh-Hemphill Co.
* Reading Steel Casting Co. (Inc.)
(Reading Valve & Fittings Div.)
Treadwell Engineering Co.

Castings, White Metal
* Doehler Die-Casting Co.

Cement, Asbestos
Carey, Philip Co.

Cement, Iron and Steel
Smooth-On Mfg. Co.

Cement, Pipe Joint
Smooth-On Mfg. Co.

Cement, Refractory
* Celite Products Co.
Johns-Manville (Inc.)
* King Refractories Co. (Inc.)
* Quigley Furnace Specialties Co.

Cement, Water-Resistant
Smooth-On Mfg. Co.

Cement Machinery
* Allis-Chalmers Mfg. Co.
Hill Clutch Mach. & Fdry. Co.
Link-Belt Co.
* Smidth, F. L. & Co.
* Worthington Pump & Machinery Corp'n

Centrifugals, Chemical
Tolhurst Machine Works

Centrifugals, Metal Drying
Tolhurst Machine Works

Centrifugals, Sugar
Fletcher Works
Tolhurst Machine Works
* Worthington Pump & Mchry. Corp'n

Chain Belts and Links
Chain Belt Co.
* Diamond Chain & Mfg. Co.
* Gifford-Wood Co.
* Jones, W. A. Fdry. & Mach. Co.
Link-Belt Co.
Union Chain & Mfg. Co.
* Whitney Mfg. Co.

Chains, Block
Reading Chain & Block Corp'n

Chains, Crane
Reading Chain & Block Corp'n

Chains, Power Transmission
Baldwin Chain & Mfg. Co
Chain Belt Co.
* Diamond Chain & Mfg. Co.
Link-Belt Co.
* Morse Chain Co.
Union Chain & Mfg. Co.
* Whitney Mfg. Co.

Charging Machines
* Whiting Corp'n

Chimneys, Brick (Radial)
Morrison Boiler Co.

Chucking Machines
* Jones & Lamson Machine Co
* Warner & Swasey Co.

Chucks, Drill
* S K F Industries (Inc.)
* Whitney Mfg. Co.

Chucks, Tapping
* Whitney Mfg. Co.

Chutes
Chain Belt Co.
* Gifford-Wood Co.
* Hendrick Mfg. Co.
Link-Belt Co.

Cigar Making Machinery
* American Machine & Foundry Co.

Cigarette Making Machinery
* American Machine & Foundry Co.

Circuit Breakers
* General Electric Co.
* Westinghouse Elec. & Mfg. Co.

Circulators, Feed Water
* Schutte & Koerting Co.

Circulators, Steam Heating
* Schutte & Koerting Co.

Cloth, Rubber
Garlock Packing Co.
* Goodrich, B. F. Rubber Co.

Cloth, Tracing
Dietzgen, Eugene Co.
Keuffel & Esser Co.
New York Blue Print Paper Co.
ParVell Laboratories
U. S. Blue Co.
Weber, F. Co. (Inc.)

Clutches, Friction
* Allis-Chalmers Mfg. Co.
* Brown A. & F. Co.
* Falls Clutch & Machinery Co.
Farrel Foundry & Machine Co.
Fletcher Works
* Gifford-Wood Co.
Hill Clutch Mach. & Fdry. Co.
Johnson, Carlyle Machine Co.
* Jones, W. A. Fdry. & Mach. Co.
Link-Belt Co.
* Medart Co.
Philadelphia Gear Works
* Western Engineering & Mfg. Co.
* Wood's, T. B. Sons Co.

Coal
Pennsylvania Coal & Coke Co.

Coal and Ash Handling Machinery
* Brown Hoisting Machinery Co.
Chain Belt Co.
* Gifford-Wood Co.
Link-Belt Co.

Coal Bins
* Brown Hoisting Machinery Co.
Chain Belt Co.
Link-Belt Co.

Coal Breakers and Cleaners
Pennsylvania Crusher Co.

Coal Mine Equipment and Supplies
* General Electric Co.

Coal Mining Machinery
* General Electric Co.
* Ingersoll-Rand Co.

Coal Preparing Equipment
Grindle Fuel Equipment Co.

Coaling Stations, Locomotive
Chain Belt Co.
* Gifford-Wood Co.
Link-Belt Co.

Coating (Metal Protecting)
* American Machine & Foundry Co.

Cocks, Air and Gage
* American Schaeffer & Budenberg Corp'n
* Ashton Valve Co.
* Crane Co.
* Jenkins Bros.
Lunkenheimer Co.
* Reading Steel Casting Co. (Inc.)
(Pratt & Cady Division)
* Vogt, Henry Machine Co.

Cocks, Blow-off
* Crane Co.
Lunkenheimer Co.
* Pittsburgh Valve, Fdry. & Const. Co.
* Reading Steel Casting Co. (Inc.)
(Pratt & Cady Division)
* Reliance Gauge Column Co.

Cocks, Three-Way and Four-Way
* American Schaeffer & Budenberg Corp'n
* Crane Co.
* Crosby Steam Gage & Valve Co.
Lunkenheimer Co.
* Pittsburgh Valve, Fdry. & Const. Co.
* Reading Steel Casting Co. (Inc.)
(Pratt & Cady Division)

Coils, Pipe
* Superheater Co
* Vilter Mfg. Co.
* Vogt, Henry Machine Co.

Coke
Pennsylvania Coal & Coke Co.

Cold Storage Plants
* De La Vergne Machine Co.

Collars, Shafting
Chain Belt Co.
Hill Clutch Machine & Fdry. Co.
Link-Belt Co.
* Medart Co.
* Royersford Fdry. & Mach. Co.
* Wood's, T. B. Sons Co.

Coloring (Metal)
* American Metal Treatment Co.

Combustion (CO_2) Recorders
* Sarco Co. (Inc.)
* Tagliabue, C. J. Mfg. Co.
* Uehling Instrument Co.

Compressors, Air
* Allis-Chalmers Mfg. Co.
* General Electric Co.
* Goulds Mfg. Co.
* Ingersoll-Rand Co.
Mackintosh-Hemphill Co.
* Nordberg Mfg. Co.
* Titusville Iron Works Co.
* Wayne Tank & Pump Co.
* Worthington Pump & Machinery Corp'n

Compressors, Air, Centrifugal
* De Laval Steam Turbine Co.
* General Electric Co.

Compressors, Air, Compound
* Ingersoll-Rand Co.
* Nordberg Mfg. Co.
* Worthington Pump & Machinery Corp'n

Compressors, Ammonia
* Frick Co. (Inc.)
* Ingersoll-Rand Co.
* Vilter Mfg. Co.
* Vogt, Henry Machine Co.
* Worthington Pump & Machinery Corp'n

Compressors, Gas
* De Laval Steam Turbine Co.
* General Electric Co.
* Ingersoll-Rand Co.
* Nordberg Mfg. Co.
* Worthington Pump & Machinery Corp'n

Condensers, Ammonia
* De La Vergne Machine Co.
* Frick Co. (Inc.)
* Ingersoll-Rand Co.
* Vilter Mfg. Co.
* Vogt, Henry Machine Co.

Condensers, Barometric
* Allis-Chalmers Mfg. Co.
Buffalo Steam Pump Co.
* Ingersoll-Rand Co.
* U. S. Cast Iron Pipe & Fdry. Co.
* Wheeler, C. H. Mfg. Co.
* Wheeler Condenser & Engrg. Co.
* Worthington Pump & Machinery Corp'n

Condensers, Jet
* Allis-Chalmers Mfg. Co.
Buffalo Steam Pump Co.
Elliott Co.
* Ingersoll-Rand Co.
* Nordberg Mfg. Co.
* Schutte & Koerting Co.
* Wheeler, C. H. Mfg. Co.
* Wheeler Condenser & Engrg. Co.
* Worthington Pump & Machinery Corp'n

Condensers, Surface
* Allis-Chalmers Mfg. Co.
Bethlehem Shipbldg.Corp'n(Ltd.)
Elliott Co.
* Ingersoll-Rand Co
* Nordberg Mfg. Co.
* Westinghouse Electric & Mfg. Co.
* Wheeler, C. H. Mfg. Co.
* Wheeler Condenser & Engrg. Co.
* Worthington Pump & Machinery Corp'n

Conduits
Johns-Manville (Inc.)

Controllers, Automatic, for Temperature or for Pressure
(See Regulators)

Controllers, Electric
* Elwell-Parker Electric Co.
* General Electric Co.
* Westinghouse Electric & Mfg. Co.

Controllers, Filter Rate
* Builders Iron Foundry
* Simplex Valve & Meter Co.

Controllers, Liquid Level
* General Electric Co.
* Simplex Valve & Meter Co.
* Tagliabue, C. J. Mfg. Co.

Converters, Steel
* Whiting Corporation

Converters, Synchronous
* Allis-Chalmers Mfg. Co.
* General Electric Co.
Ridgway Dynamo & Engine Co.
* Westinghouse Electric & Mfg. Co.

*Catalogue data of firms marked * appear in the A.S.M.E. Condensed Catalogues of Mechanical Equipment, 1923-24 Volume*

Australia." Engineering, vol. 117, no. 3035, Feb. 29, 1924, pp. 268–269, 9 figs. on p. 272. Describes installation of modified form of Michell thrust, utilizing existing thrust shaft, and fitting into existing housing.

BLAST-FURNACE GAS

Cleaning. Practical Tests on a Blast-Furnace-Gas Wet-Cleaning Plant (Betriebsversuche an einer Hochofengas-Nassreinigungsanlage), M. Steffes. Stahl u. Eisen, vol. 44, no. 4, Jan. 24, 1924, pp. 92–96, 14 figs. Results of six-day tests; determination of best operating conditions; degree of purification; water and power consumption and efficiency of different plants.

BLAST FURNACES

Low- vs. High-Pressure Blowing. Relation between Cross Section of a Blast Furnace and Its Manner of Blowing (Relation entre le profil d'un fourneau et son mode de soufflage), M. Derclaye. Revue Universelle des Mines, vol. 1, no. 3, Feb. 1, 1924, pp. 146–184, 7 figs. Investigation to determine whether manner of blowing, that is, at low or high pressure, has relation to cross-section of blast furnace; characteristics of different types of blast furnaces; comparison between low-shaft and tall-shaft furnaces, showing advantages of former, with low-pressure blowing.

BLOWERS

Turbo. Turbo-Blowers for the New Royal Dutch Works, P. Ostertag. Iron & Coal Trades Rev., vol. 108, no. 2917, Jan. 25, 1924, pp. 133–134, 7 figs. Describes construction and enumerates results of tests carried out on one of three blast-furnace blowers delivered by Escher Wyss & Co., Zurich, Switzerland, to order of Kon. Ned. Hoogovens & Staalfabricken at The Hague. Translated from Schweizer. Bauzeitung.

BOILER FEEDWATER

Regulators. Mechanical Control of Boiler Feed Water, C. E. Wolff. Power Plant Eng., vol. 28, no. 5, Mar. 1, 1924, pp. 277–278, 4 figs. Points out that diverse demands of engineers in feedwater-regulation practice are being met by modern regulators, and sets forth requirements which must exist in regulators for effective results.

Treatment. The Cost of Boiler Feed Water, J. T. Beard. 2nd. Paper, vol. 33, no. 16, Feb. 7, 1924, pp. 5–7, 2 figs. Cost of impurities in boiler feedwater, and notes on methods of treatment, including softening.

BOILER FURNACES

Air Preheating for. Air Preheating, F. Dawson. Eng. & Boiler House Rev., vol. 37, no. 8, Mar. 1924, pp. 274–276, 5 figs. Brief review of present state of development.

Draft. Draught and its Effects on the Working and Efficiency of Boilers, J. T. Ruddock. Eng. & Boiler House Rev., vol. 37, no. 8, Mar. 1924, pp. 279–281, 1 fig. Deals with plants working with induced or chimney draft only; shows necessity for securing necessary draft pressure in combustion chamber itself. From paper read before Elec. Power Engrs.' Assn.

Gas-Fired. Combustion in Gas-Fired Boiler Furnaces, Heat Transmission in Refractory Brick, and the Problem of Heat-Storage Linings (Ueber die Verbrennung in Gasbrennern, den Wärmeübergang an feuerfesten Stein und über die Frage der Wärmespeicherausmauerung), H. Lent. Wärme, vol. 47, nos. 3, 4 and 5, Jan. 18, 25 and Feb. 1, 1924, pp. 24–26, 33–37 and 45–49, 18 figs. Describes experimental pipe section for investigating phenomena in furnace and in combustion chamber in the burning of blast-furnace gas under different conditions; also temperature along pipe section and heat-transmission conditions.

Oil-Fired. Burning Oil Under Power Boilers, R. F. Burke. Power Plant Eng., vol. 28, no. 6, Mar. 15, 1924, pp. 328–330, 3 figs. Points out that localization of heat in furnace must be avoided if brickwork and boiler maintenance are to be kept low; flame impingement causes tube failures; short flame may result from high per cent of excess air.

Turbine. The "Turbine" Forced Draught Furnace. Electrician, vol. 92, no. 2386, Feb. 8, 1924, p. 164, 2 figs. Description of a steam jet furnace made by Turbine Furnace Co., employing low-grade fuel.

BOILER HOUSES

Control. Records and Efficiency at a London Power Station. Eng. & Boiler House Rev., vol. 37, no. 8, Mar. 1924, pp. 269–270 and 272, 4 figs. Notes on methods of boiler-house control at Central Elec. Supply Co., Ltd., London.

BOILER OPERATION

Draft Regulation. The Craig System of Better Draft Control. Steam Power, vol. 2, no. 12, Jan. 1924, pp. 7 and 10, 1 fig. Describes Craig regulator and its operation; automatically maintains a constant over-fire draft by controlling position of uptake damper.

To Regulate Fuel Expense, Control Draft, Jas. T. Beard. Power Plant Eng., vol. 28, no. 6, Mar. 15, 1924, pp. 331–334, 6 figs. Points out that height of stack limits strength of draft; stokers are more efficient than grates; correctness of air supply indicated by CO_2 percentage.

BOILERMAKING

Methods. Modern Boilermaking Methods. Eng. Production, vol. 7, no. 138, Mar. 1924, pp. 78–81, 8 figs. Describes works and procedure of Davey, Paxman, & Co., Ltd., Colchester, Eng., makers of all types of steam boilers.

BOILERS

Accidents. Peculiar Cases of Accidents to Containers and Boiler Parts (Eigenartige Zerstörungen von Gefässen und Kesselteilen), M. Grellert. Gesundheits-Ingenieur, vol. 47, no. 7, Feb. 16, 1924, pp. 49–52, 4 figs. Gives a number of concrete examples showing that accidents are often due to causes other than those assumed or anticipated; all the cases cited were due to inadequate calculation of design or to careless construction.

Exhaust-Gas. Waste Exhaust Gases of Low-Powered Oil Engines. Oil Engine Power, vol. 2, no. 2, Feb. 1924, pp. 90–91, 2 figs. Design and results of two types of small exhaust-gas boilers, one for a 2-cycle surface-ignition unit and other for a 4-cycle Diesel engine.

Locomotive. See LOCOMOTIVE BOILERS.

BOILERS, WATER-TUBE

Two-Flow Ring-Circuit. The Kidwell Two-Flow Ring-Circuit Boiler. Pac. Mar. Rev., vol. 21, no. 2, Feb. 1924, p. 119, 1 fig. Boiler is said to introduce entirely new principle of arrangement in water-tube boilers.

Types. Water-tube Boilers, C. C. Pounder. Mech. World, vol. 75, nos. 1932 and 1936, Jan. 11 and Feb. 8, 1924, pp. 26–27 and 84–86, 6 figs. Description of various types.

BOLTS

Tension Calculation. Charts for Tension in Bolts and Torsion in Shafts, E. Patterson. Am. Mach., vol. 60, no. 11, Mar. 13, 1924, pp. 401–402, 2 figs. Two simple alignment charts intended to provide quick solutions for problems in stresses.

BRAKES

Air. A Review of Power Brake Operation and the Results Obtained on the Southern Pacific, J. Kruttschnitt. Ry. & Locomotive Eng., vol. 37, no. 3, Mar. 1924, pp. 72–74. Developed in testimony before Interstate Commerce Commission.

I. C. C. Continues the Brake Investigation. Ry. Age, vol. 76, no. 10, Mar. 8, 1924, pp. 551–554. Am. Ry. Assn. observers disagree with Bur. of Safety report on Norfolk & Western tests of automatic straight air brakes.

BRASS

Annealing, Effect of. Effect of Anneal on Brass Surfaces, J. L. Christie. Iron Age, vol. 113, no. 11, Mar. 13, 1924, pp. 783–785, 6 figs. High ductility obtained only by losing smoothness; grain size under microscope a measure of both ductility and amount of annealing.

Brittle Ranges. The Brittle Ranges in Brass as Shown by the Izod Impact Test, D. Bunting. Inst. Metals—advance paper, no. 2, for meeting Mar. 12–13, 1924, 22 pp., 15 figs. Investigates (1) brittle ranges of brass varying in composition from 100 to 50 per cent copper; (2) effect of rapid cooling on brittle ranges; (3) cause of brittle ranges.

Dezincification. A Further Study of the Dezincification of Brass, C. F. Nixon. Am. Electrochem. Soc.—advance paper, no. 3, for meeting, Apr. 24–26, 1924, pp. 29–41, 2 figs. From experimental evidence it is concluded that, with exception of 90 per cent, or more, copper alloys, commercial brasses are subject to dezincification.

Heat Treatment. Relation of Heat Treatment to the Microstructure of 60–40 Brass, R. S. Williams and V. O. Homerberg. Am. Inst. Min. & Met. Engrs.—Trans., No. 1305-N, Mar. 1924, 15 pp., 40 figs. Description of a double heat treatment of 60–40 brass; gives photomicrographs showing changes that take place in microstructure on reheating water-quenched specimens.

Relation of Heat Treatment, Mechanical Properties, and Microstructure of 60–40 Brass, V. O. Homerberg and D. N. Shaw. Am. Inst. Min. & Met. Engrs.—Trans., No. 1334-N, Mar. 1924, 10 pp., 16 figs. Results obtained when test pieces were given a double heat treatment and then tested for mechanical properties, and microstructure studied.

BRASS FOUNDRIES

Improving Conditions in. Humanizing Brass Foundries, Chas. Vickers. Foundry, vol. 52, no. 5, Mar. 1, 1924, pp. 185–189, 5 figs. Points out that unattractive features often serve to deter men from taking up brass-casting work; suggests eliminating noise and fumes.

BRONZES

Cold Drawing and Annealing, Effect of. Note on the Effect of Cold-Drawing and Annealing on Some Electrochemical Properties of a Low-Tin Bronze, S. H. J. Wilson. Inst. Metals—advance paper, no. 14, for meeting Mar. 12–13, 1924, 11 pp., 5 figs. Investigation which is result of discovery by Alkins of a critical range in curve relating the amount of cold work received by copper or bronze wire to several physical properties.

Sand-Cast Zinc. The Effect of Casting Temperature on the Physical Properties of a Sand-Cast Zinc-Bronze, F. W. Rowe. Inst. Metals—advance paper, no. 12, for meeting Mar. 12–13, 1924, 6 pp., 8 figs. Investigation to determine, for works use, optimum casting temperature to give required mechanical properties in gun metal of composition specified.

C

CABLEWAYS

Longitudinal Profile. The Equilibrium Profile of Cableways (Das Gleichgewichtsprofil der Seilbahn), H. H. Peter. Schweizerische Bauzeitung, vol. 83, no. 5, Feb. 2, 1924, pp. 58–59. Simplified method of determining advantageous longitudinal profile, the so-called theoretical (ideal, compensated) or equilibrium profile.

CALORIMETERS

Iron-Mercury. An Iron-Mercury Calorimeter, F. H. Schofield. Jl. of Sci. Instruments, vol. 1, no. 5, Feb. 1924, pp. 141–144, 4 figs. Describes calorimeter which is specially suitable for measuring specific heat of materials of low thermal conductivity which react with water.

CAR LIGHTING

Head-End System. Head-End Car Lighting System of the St. Paul, C. R. Gilman. Ry. Elec. Engr., vol. 15, no. 3, Mar. 1924, pp. 73–76, 11 figs. Description of head-end system, as used for electric lighting of passenger trains on Chicago, Milwaukee & St. Paul in contrast with individual car-axle system. Running repairs and electric-fan repairs made.

CAR WHEELS

Tire Fractures. The Cause of Tire Fractures (Ueber die Ursache von Radreifenbrüchen), W. Marzahn. Glasers Annalen, vol. 94, no. 4, Feb. 15, 1924, pp. 37–41, 7 figs. Investigations of broken wheel tires showing causes due to faults in material and in workmanship; preventive measures to be observed in steel works and workshop.

Wrought-Steel, Gaging of. Gaging Wrought Steel Wheels for Car and Tender, A. Knapp. Ry. Mech. Engr., vol. 98, no. 3, Mar. 1924, pp. 164–167, 13 figs. Discussion on use of new A. R. A. steel wheel gage for determining defects, turning wheels and billing. Abstract of paper before Car Foremen's Assn. of Chicago.

CARBURETORS

Characteristics of Ideal and Commercial. Comparison of Ideal and Commercial Carbureter-Characteristics, C. S. Kegerreis. Soc. Automotive Engrs.—Jl., vol. 14, no. 3, Mar. 1924, pp. 286–301, 21 figs. Computed data illustrate car carburetion requirements of various cars for level-road operation; results of car-test data procured from various sources show information regarding advisability of using straight-line mixtures; data on commercial carburetors; summary of 23 carburetors tested for general conclusions; results give information on effect of air temperatures on metering; 11 devices are compared with ideal carburetor at various car speeds.

CARS, FREIGHT

Gondola, Hopper-Bottom. 57½-Ton Hopper Bottom Gondola for C. & O. Ry. Mech. Engr., vol. 98, no. 3, Mar. 1924, pp. 161–164, 6 figs. Are stronger and of greater capacity than previous cars of same weight; steel construction; length 31 ft. 6 in., width 10 ft., height from rail to top of body 11 ft.

Grain. New 40-Ton Bogie Wagons for South African Railways. Ry. Gaz., vol. 40, no. 6, Feb. 8, 1924, p. 167, 2 figs. Principal data of all-steel cars to be used for conveyance of grain in bulk from farming districts to S. African ports; for 3-ft. 6-in. gage; arranged for end or bottom discharge.

Hart Convertible. New Ballast Cars of the Michigan Central R. R. Ry. Rev., vol. 74, no. 10, Mar. 8, 1924, pp. 435–438, 4 figs. Describes Hart convertible car; can be used as a gondola or dump car in ordinary traffic; capacity of 50 tons.

Rapid Construction. Bangor & Aroostook Car Building Contest. Ry. Age, vol. 76, no. 9, Mar. 1, 1924, pp. 511–513, 6 figs. Box cars, including trucks, completed by two crews in total time of 94 man-hours each.

CARS, PASSENGER

Steel. All-Steel Carriages for Sydney Suburban Railways, Commonwealth Engr., vol. 11, no. 5, Dec. 1, 1923, pp. 175–178, 2 figs. Description of car bodies ordered from Leeds Forge Co., England, by New South Wales railway department; contract covers only complete shell of car body, including doors, windows and partitions, but exclusive of bogies, couplings and draft gear, seats, parcel racks and other furnishings, which will be manufactured locally.

Suburban. Missouri Pacific Acquires Light Suburban Cars. Ry. Age, vol. 76, no. 15, Mar. 15, 1924, pp. 747–749, 4 figs. Design provides strength of through passenger coach; weighs 1000 lb. per seated passenger.

CARS, REFRIGERATOR

Ventilated. Ventilated Rock Island Refrigerator Cars. Ry. Age, vol. 76, no. 10, Mar. 8, 1924, pp. 547–549, 5 figs. Special attention given to method of insulating in cars built by Gen. Am. Car Co., Chicago; Acme ventilation system installed.

CARS, TANK

Can. Pacific Ry. New Tank Cars for Canadian Service. Ry. Rev., vol. 74, no. 8, Feb. 23, 1924, pp. 324–327, 3 figs. Description of cars built by Can. Pacific Ry. to A. R. A. Class III specifications; tank capacity 12,480 gal.

CAST IRON

Carbon Control. States Carbon Control Theory, A. C. Porter. Foundry, vol. 52, no. 5, Mar. 1, 1924, pp. 194–195. Sulphur to manganese ratio said to exert regulating influence on amount of carbon in gray cast iron and on ratio of combined to graphitic carbon.

Gas and Oxygen Determination. Gas and Oxygen Determinations in Iron, Especially Cast Iron (Ueber Gas- und Sauerstoffbestimmungen im Eisen, insbesondere Gusseisen), P. Oberhoffer, E. Piwowarsky, A. Pfeifer-Schiessl and H. Stein. Stahl u. Eisen, vol. 44, no. 5, Jan. 31, 1924, pp. 113–116, 5 figs. Oxygen contents in low-carbon steel and cast iron; determination of oxygen from gas contents through hot extraction in vacuum; influence of oxygen contents on properties of cast iron.

Manufacture. The History of the Manufacture

Manufactured by Advertisers

CLASSIFIED LIST OF MECHANICAL EQUIPMENT

Alphabetical List on page 174

Conveying Machinery
* Brown Hoisting Machinery Co.
Chain Belt Co.
* Gifford-Wood Co.
Hill Clutch Machine & Fdry. Co.
* Jones, W. A. Fdry. & Mach. Co.
Link-Belt Co.

Conveying Systems, Powdered Coal
Grindle Fuel Equipment Co.

Conveyor Systems, Pneumatic
* Allington & Curtis Mfg. Co.
* Sturtevant, B. F. Co.

Conveyors, Belt
* Brown Hoisting Machinery Co.
Chain Belt Co.
Gandy Belting Co.
* Gifford-Wood Co.
Link-Belt Co.

Conveyors, Bucket, Pan or Apron
* Brown Hoisting Machinery Co.
Chain Belt Co.
* Gifford-Wood Co.
* Jones, W. A. Fdry. & Mach. Co.
Link-Belt Co.

Conveyors, Chain
* Brown Hoisting Machinery Co.
Chain Belt Co.
Link-Belt Co.

Conveyors, Ice
Chain Belt Co.
* Gifford-Wood Co.
Link-Belt Co.

Conveyors, Portable
* Gifford-Wood Co.
Link-Belt Co.

Conveyors, Screw
Chain Belt Co.
* Gifford-Wood Co.
Link-Belt Co.

Cooling Ponds, Spray
* Cooling Tower Co. (Inc.)
* Schutte & Koertiug Co.
* Spray Engineering Co.

Cooling Towers
* Burhorn, Edwin Co.
* Cooling Tower Co. (Inc.)
* Spray Engineering Co.
* Wheeler, C. H. Mfg. Co.
* Wheeler Condenser & Engrg. Co.
* Worthington Pump & Machinery Corp'n

Copper, Drawn
* Roebling's, John A. Sons Co.

Copper Converting Machinery
* Allis-Chalmers Mfg. Co.
* Worthington Pump & Machinery Corp'n

Counterbores
* Cleveland Twist Drill Co.

Counters, Revolution
* American Schaeffer & Budenberg Corp'n
* Ashton Valve Co.
* Bristol Co.
* Crosby Steam Gage & Valve Co.
Veeder Mfg. Co.

Countershafts
* Builders Iron Foundry
Hill Clutch Machine & Fdry. Co.
* Royersford Fdry. & Mach. Co.
* Wood's, T. B. Sons Co.

Countersinks
* Cleveland Twist Drill Co.

Couplings, Pipe
Byers, A. M. Company
* Central Foundry Co.
* Crane Co.
Lunkenheimer Co.

Coupling, Shaft (Flexible)
* Allis-Chalmers Mfg. Co.
* Brown, A. & F. Co.
* Falk Corporation
* Fawcus Machine Co.
Hill Clutch Machine & Fdry. Co.
* Jones, W. A. Fdry. & Mach. Co.
* Medart Co.
* Nordberg Mfg. Co.
* Smith & Serrell

Coupling, Shaft (Rigid)
* Allis-Chalmers Mfg. Co.
* Brown, A. & F. Co.
Chain Belt Co.
Cumberland Steel Co.
* Falls Clutch & Machinery Co.
Farrel Foundry & Machine Co.
* General Electric Co.
Hill Clutch Machine & Fdry. Co.
* Jones, W. A. Fdry. & Mach. Co.
Link-Belt Co.
* Medart Co.
* Royersford Fdry. & Mach. Co.
* Smith & Serrell
* Wood's, T. B. Sons Co.

Couplings, Universal Joint
* Wood's, T. B. Sons Co.

Coverings, Steam Pipe
Carey, Philip Co.
Johns-Manville (Inc.)

Cranes, Electric Traveling
* Whiting Corporation

Cranes, Floor (Portable)
Baker R. & L. Co.
* Elwell-Parker Electric Co.
Lidgerwood Mfg. Co.

Cranes, Gantry
* Brown Hoisting Machinery Co.
Link-Belt Co.
* Whiting Corp'n

Cranes, Hand Power
* Brown Hoisting Machinery Co.
Clyde Iron Works Sales Co.
* Whiting Corp'n

Cranes, Jib
Baker, R. & L. Co.
* Brown Hoisting Machinery Co.
* Elwell-Parker Electric Co.
* Whiting Corp'n

Cranes, Locomotive
* Brown Hoisting Machinery Co.
Link-Belt Co.

Cranes, Locomotive (Crawler)
Link-Belt Co.

Cranes, Locomotives, Electric
Atlas Car & Mfg. Co.

Cranes, Pillar
* Brown Hoisting Machinery Co.
* Whiting Corp'n

Cranes, Portable
Baker R. & L. Co.
* Brown Hoisting Machinery Co.
Clyde Iron Works Sales Co.
Link-Belt Co.

Cranes, Tractor
* Elwell-Parker Electric Co.

Crucibles, Graphite
Dixon, Joseph Crucible Co.

Crushers, Clinker
Farrel Foundry & Machine Co.

Crushers, Coal
* Allis-Chalmers Mfg. Co.
* Brown Hoisting Machinery Co.
* Gifford-Wood Co.
Link-Belt Co.
Pennsylvania Crusher Co.
* Smidth, F. L. & Co.
* Worthington Pump & Machinery Corp'n

Crushers, Hammer
Pennsylvania Crusher Co.

Crushers, Jaw
Farrel Foundry & Machine Co.
* Worthington Pump & Machinery Corp'n

Crushers, Ore and Rock
Farrel Foundry & Machine Co.
* Nordberg Mfg. Co.
Pennsylvania Crusher Co.

Crushers, Roll
Link-Belt Co.
Pennsylvania Crusher Co.
* Worthington Pump & Machinery Corp'n

Crushing and Grinding Machinery
* Allis-Chalmers Mfg. Co.
Farrel Foundry & Machine Co.
Pennsylvania Crusher Co.
* Smidth, F. L. & Co.
* Worthington Pump & Machinery Corpn'

Cupolas
* Bigelow Co.
* Whiting Corp'n

Cutters, Bolt
* Landis Machine Co. (Inc.)

Cutters, Milling
* Whitney Mfg. Co.

Dehumidifying Apparatus
* American Blower Co.
* Carrier Engineering Corp'n

Desaturators
* United Machine & Mfg. Co.

Derricks and Derrick Fittings
Clyde Iron Works Sales Co.
Lidgerwood Mfg. Co.

Diaphragms, Rubber
* United States Rubber Co.

Die Castings
(See Castings, Die Molded)

Die Heads, Thread Cutting (Self-opening)
* Jones & Lamson Machine Co.
* Landis Machine Co. (Inc.)

Dies, Punching
* Niagara Machine & Tool Works

Dies, Sheet Metal Working
* Niagara Machine & Tool Works

Dies, Stamping
* Niagara Machine & Tool Works

Dies, Thread Cutting
* Jones & Lamson Machine Co.
* Landis Machine Co. (Inc.)
* National Acme Co.

Diesel Engines
(See Engines, Oil, Diesel)

Digesters
* Bigelow Co.

Distilling Apparatus
* Vogt, Henry Machine Co.

Drafting Room Furniture
Dietzgen, Eugene Co.
Economy Drawing Table & Mfg. Co.
Keuffel & Esser Co.
New York Blue Print Paper Co.
ParVell Laboratories
U. S. Blue Co.
Weber, F. Co. (Inc.)

Drawing Instruments and Materials
Dietzgen, Eugene Co.
Keuffel & Esser Co.
New York Blue Print Paper Co.
ParVell Laboratories
U. S. Blue Co.
Weber, F. Co. (Inc.)

Dredges, Hydraulic
* Morris Machine Works

Dredging Machinery
Lidgerwood Mfg. Co.
* Morris Machine Works

Dredging Sleeve
* United States Rubber Co.

Drilling Machines, Multiple Spindle
* National Acme Co.

Drilling Machines, Sensitive
* Royersford Fdry. & Mach. Co.

Drilling Machines, Vertical
* Royersford Fdry. & Mach. Co.

Drills, Coal and Slate
* General Electric Co.
* Ingersoll-Rand Co.

Drills, Core
* Ingersoll-Rand Co.

Drills, Rock
* General Electric Co.
* Ingersoll-Rand Co.

Drills, Sockets and Sleeves
* Cleveland Twist Drill Co.

Drills, Twist
* Cleveland Twist Drill Co.

Drinking Fountains, Sanitary
Johns-Manville (Inc.)
Murdock Mfg. & Supply Co.

Dryers, Coal
Grindle Fuel Equipment Co.

Dryers, Rotary
* Bigelow Co.
Farrel Foundry & Machine Co.
Link-Belt Co.
* Sturtevant, B. F. Co.

Drying Apparatus
* American Blower Co.
* Carrier Engineering Corp'n
* Clarage Fan Co.
* Sturtevant, B. F. Co.

Dust Collecting Systems
* Allington & Curtis Mfg. Co.
* Allis-Chalmers Mfg. Co.
* Clarage Fan Co.
* Sturtevant, B. F. Co.

Dust Collectors
* Allington & Curtis Mfg. Co.
* Allis-Chalmers Mfg. Co.
* Sturtevant, B. F. Co.

Dynamometers
* American Schaeffer & Budenberg Corp'n
* General Electric Co.
* Wheeler, C. H. Mfg. Co.

Economizers, Fuel
* Green Fuel Economizer Co.
* Sturtevant, B. F. Co.

Ejectors
* Schutte & Koerting Co.

Electrical Machinery
* Allis-Chalmers Mfg. Co.
* General Electric Co.
* Westinghouse Electric & Mfg. Co.

Electrical Supplies
* General Electric Co.
Johns-Manville (Inc.)

Elevating and Conveying Machinery
* Brown Hoisting Machinery Co.
Chain Belt Co.
* Elwell-Parker Electric Co.
* Gifford-Wood Co.
* Jones, W. A. Fdry. & Mach. Co.
Link-Belt Co.

Elevators, Bucket & Chain
Gandy Belting Co.

Elevators, Electric
* American Machine & Foundry Co.

Elevators, Hydraulic
* Whiting Corp'n

Elevators, Pneumatic
* Whiting Corp'n

Elevators, Portable
* Gifford-Wood Co.
Link-Belt Co.

Elevators, Telescopic
Link-Belt Co.

Emery Wheel Dressers
* Builders Iron Foundry

Engine Repairs
* Franklin Machine Co.
* Nordberg Mfg. Co.

Engine Stops
* Schutte & Koerting Co.

Engines, Blowing
* Allis-Chalmers Mfg. Co.
Mackintosh-Hemphill Co.
* Nordberg Mfg. Co.
* Worthington Pump & Machinery Corp'n

Engines, Gas
* Allis-Chalmers Mfg. Co.
* De La Vergne Machine Co.
* Ingersoll-Rand Co.
* Titusville Iron Works Co.
* Westinghouse Electric & Mfg. Co.

Engines, Gasoline
* Sturtevant, B. F. Co.
* Titusville Iron Works Co.
* Worthington Pump & Machinery Corp'n

Engines, Hoisting
* Allis-Chalmers Mfg. Co.
Clyde Iron Works Sales Co.
Lidgerwood Mfg. Co.
* Morris Machine Works
* Nordberg Mfg. Co.

Engines, Kerosene
* Worthington Pump & Machinery Corp'n

Engines, Marine
Bethlehem Shipbldg.Corp'n(Ltd.)
* Ingersoll-Rand Co.
Johnson, Carlyle Machine Co.
* Nordberg Mfg. Co.
* Sturtevant, B. F. Co.
* Ward, Chas. Engineering Works
* Worthington Pump & Machinery Corp'n

Engines, Marine, Oil
Bethlehem Shipbldg.Corp'n(Ltd.)
* Ingersoll-Rand Co.
* Nordberg Mfg. Co.

Engines, Marine, Steam
Bethlehem Shipbldg.Corp'n(Ltd.)
* Nordberg Mfg. Co.

Engines, Oil
* Allis-Chalmers Mfg. Co.
Bethlehem Shipbldg.Corp'n(Ltd.)
* De La Vergne Machine Co.
* Ingersoll-Rand Co.
* Nordberg Mfg. Co.
* Titusville Iron Works Co.
* Worthington Pump & Machinery Corp'n

Engines, Oil, Diesel
* Allis-Chalmers Mfg. Co.
Bethlehem Shipbldg.Corp'n(Ltd.)
* Nordberg Mfg. Co.
* Worthington Pump & Machinery Corp'n

Engines, Pumping
* Allis-Chalmers Mfg. Co.
* Ingersoll-Rand Co.
* Morris Machine Works
* Nordberg Mfg. Co.
* Worthington Pump & Machinery Corp'n

Engines, Steam
* Allis-Chalmers Mfg. Co.
* American Blower Co.
Bethlehem Shipbldg.Corp'n (Ltd.)
* Clarage Fan Co.
Clyde Iron Works Sales Co.
* Cole, R. D. Mfg. Co.
* Engberg's Electric & Mech. Wks.
* Erie City Iron Works
* Harrisburg Fdry. & Mach. Wks.
* Ingersoll-Rand Co.
* Leffel, James & Co.
Lidgerwood Mfg. Co.
Mackintosh-Hemphill Co.
* Morris Machine Works
* Nordberg Mfg. Co.
Ridgway Dynamo & Engine Co.
* Skinner Engine Co.
* Sturtevant, B. F. Co.

*Catalogue data of firms marked * appear in the A.S.M.E. Condensed Catalogues of Mechanical Equipment, 1923-24 Volume*

of Cast Iron. T. Makemson. Foundry Trade Jl., vol. 29, no. 392, Feb. 21, 1924, pp. 153–157. Ancient iron workers; ironmaking in Middle Ages, discovery and early uses of cast iron; early use of coke; evolution of blast furnace and foundry; etc.

Sulphur, Influence on. The Influence of Sulphur on Cast Iron (Der Einfluss des Schwefels auf das Gusseisen), C. Röber. Praktischer Maschinen-Konstrukteur, vol. 57, no. 1–2, Jan. 8, 1924, pp. 5–6. Means of reducing sulphur content in finished products; injurious effects of high sulphur content in finished castings; calorimetric determination of sulphur according to Eggertz method.

Welding. Expansion in Iron Castings, D. Richardson. Welding Engr., vol. 9, no. 2, Feb. 1924, pp. 19–20, 4 figs. How distribution of mass in casting determines correct procedure in preheating.

CASTINGS

Bronze Autoclave Body. Making Bronze Autoclave Body, David Whyte. Metal Industry (Lond.), vol. 24, no. 8, Feb. 22, 1924, pp. 174–175, 2 figs. Method of producing sound hydraulic castings of this type of following alloy: 86 Cu, 13 Sn, 1 Zn.

CENTRAL STATIONS

Inspection. Periodic Power-Plant Inspection. Power, vol. 59, no. 11, Mar. 11, 1924, pp. 404–405. List of general instructions issued by Fed. Light & Traction Co., New York City, to managers of their subsidiary companies.

Manchester, England. The Barton Power-Station of the Manchester Corporation, and the Transmission-System in Connection therewith, H. N. Alliott and S. L. Pearce. Instn. Civ. Engrs.—Sessional Notices, no. 3, Feb. 1924, pp. 62–64. Site can accommodate 165,000 kw. of plant, whereof first section consists of 82,500 kw.; details of station equipment. (Abstract.)

Victoria, Australia. New Power Plant for Geelong, Vic., Electricity Supply. Commonwealth Engr., vol. 11, no. 4, Nov. 1, 1923, pp. 137–144, 5 figs. Describes condensing water, generating units, boilers, and distributing system; involves generation of 6000 to 6600 volts, 3-phase, 50 frequency.

Weymouth, Mass. Some Engineering Features of the Weymouth Station of the Edison Electric Illuminating Company of Boston, I. E. Moultrop and J. Pope. Universal Engr., vol. 39, no. 2, Feb. 1924, pp. 14–23, 8 figs. Brief description of station and its equipment, with discussion of engineering features of more timely interest; initial main generating equipment to consist of two 32,000-kw. turbines each driving a main 30,000-kw. generator and a 2000-kw. auxiliary generator direct-connected to shaft of main generator.

CHARTS

Application in Industry. Application of Charts in Industry, D. B. Porter. Mgt. & Administration, vol. 7, nos. 1 and 3, Jan. and Mar. 1924, pp. 65–72, 12 figs.; and 329–336, 10 figs. Jan.: Management-data summary; presents historical charts drawn chiefly from fields of sales and financial data. Mar.: Application of charts which show frequency with which events occur under conditions of non-historical nature.

CHROME-NICKEL STEEL

Deoxidation, Influence of. The Influence of Deoxidation on Hot-Working Capacity and Properties of a Chrome-Nickel Structural Steel (Der Einfluss der Deoxydation auf die Warmverarbeitbarkeit und die Eigenschaften eines Chromnickel-Baustahles), W. Oertel and L. A. Richter. Stahl u. Eisen, vol. 44, no. 7, Feb. 14, 1924, pp. 169–175, 5 figs. Investigation of cracks; influence of casting temperature and speed, rolling temperature, and time required for heating rolling material; deoxidation and distillation; properties of steel produced under different conditions.

CLUTCHES

Automobile. A New Flexible Coupling Device (Un nouveau dispositif d'accouplement flexible), E. Guillcaume. L'Industrie des Tramways, vol. 18, no. 205, Jan. 1924, pp. 11–14, 3 figs. Describes elastic device which is claimed to have many advantages over universal joint; gives results of tests and explains adaptation of this transmission to automobiles.

American Stock Clutch and Axle Specifications. Automotive Industries, vol. 50, no. 8, Feb. 21, 1924, pp. 446–450. Tabular data.

Construction and Uses. Construction Details and Use of Clutches and Cutoff Couplings, F. E. Gooding. Indus. Engr., vol. 82, nos. 1 and 2, Jan. and Mar. 1924, pp. 5–9 and 127–130, 29 figs. Construction and operation of friction and magnetic clutches and cut-off couplings, and information necessary when ordering and installing them.

COAL

Recovery from Ashes. Fuel Recovery From Pan Ash. Gas Jl., vol. 165, no. 3167, Jan. 23, 1924, pp. 200–201, 3 figs. Description of dry-magnetic ash-separating process and equipment.

COAL HANDLING

Loaders. One More Mechanical Loader Comes to Light. Coal Age, vol. 25, no. 9, Feb. 28, 1924, pp. 305–306, 2 figs. Wilson chain loader for low coal weighs 4600 lb. and has maximum height of 32 in.; it has loaded 69 tons of coal a day and 120 tons of loose gob.

COLD STORAGE

Plants. Refrigeration at French Ports. Cold Storage, vol. 27, no. 311, Feb. 21, 1924, pp. 47–48, 2 figs. Notes on layout and equipment of Bordeaux-Bassens dock stores.

Washington's Storage Plant. Refrig. World, vol. 59, no. 1, Feb. 1924, pp. 13–18, 14 figs. Describes new warehouse and raw-water ice plant of Terminal Refrig. & Warehousing Co.

COMBUSTION

Molar Calculation. The Molar Calculation of Combustion Processes with Use of Nomograms (Die molare Berechnung von Verbrennungsvorgängen unter Verwendung von Nomogrammen), W. Otte. Wärme, vol. 47, no. 2, Jan. 11, 1924, pp. 11–14, 5 figs. Advantages of molar calculation; formulas; use of nomograms in connection with molar calculation of combustion processes; examples.

COMPRESSED AIR

Meters. Compressed-Air Meters (Pressluftmesser), A. Grossmann. Maschinenbau, vol. 3, no. 9, Feb. 14, 1924, pp. 249–250, 4 figs. Comparisons between compressed-air meters with and without shock-absorbing air chamber; points to incorrect results obtained with meters when compressed-air tool is directly attached, and favorable results obtained by attachment of shock-absorbing air chamber.

CONDENSERS, STEAM

Performance of, Checking. Condenser Performance, J. Bruce. Elec. Rev., vol. 94, no. 2410, Feb. 1, 1924, pp. 164–166, 6 figs. Describes simple and easily applicable methods for checking condenser performance of generating set in few moments, and also system whereby continuous tabulated and graphical record of such performance can be recorded from day to day, showing behavior of plant at glance.

Surface. Efficient Operation of Surface Condensing Plant. Elec. Times, vol. 65, no. 1685, Jan. 31, 1924, pp. 117–119, 1 fig. Suggestions in regard to efficient operation; chart for determination of partial pressure of air under varying conditions of vapor temperature and absolute pressure.

Surface Condenser Operation, C. S. Tomlinson. Elec. Light & Power, vol. 2, no. 3, Mar. 1924, pp. 13–14, 60 and 62, 2 figs. Gives two formulas which can be used in studying condenser operation and shows how to apply them.

CONVEYORS

Continuous vs. Intermittent. Continuous Versus Intermittent Conveyors and Handling Methods, G. F. Zimmer. Indus. Mgt. (Lond.), vol. 11, no. 3, Feb. 7, 1924, pp. 77–80, 4 figs. General distinguishing features of the two systems; possibility of increasing capacity of an existing conveyor installation; comparison between working costs; continuous and intermittent industrial methods; etc.

Pulverized Material. Fuller-Kinyon System of Conveying Pulverized Coal and Other Materials. Indus. Mgt. (Lond.), vol. 11, no. 4, Feb. 21, 1924, pp. 103–106, 4 figs. Description of system whose outstanding characteristics are simplicity, safety and cleanliness.

COOLING TOWERS

Calculation. The Calculation of Cooling Towers (Berechnung von Kühltürmen), C. Geibel. Zeit. des Vereines deutscher Ingenieure, vol. 68, no. 7, Feb. 16, 1924, pp. 152–153, 1 fig. Setting up heat equations with aid of which cooling-plant values can be determined; points out that laws of current, speed of evaporation and state of outgoing air are unknown conditions which must be determined.

Steel. Cooling Towers for Steam Condensing Plant. World Power, vol. 1, no. 2, Feb. 1924, pp. 119–123, 6 figs. Recent designs of steel cooling towers manufactured by Worthington-Simpson, Ltd., for which many advantages are claimed.

COPPER ALLOYS

Copper-Aluminum. X-Ray Studies on the Copper-Aluminium Alloys, E. R. Jette, G. Phragmén and A. F. Westgren. Inst. Metals—advance paper, no. 9, for meeting Mar. 12–13, 1924, 14 pp., 7 figs. X-ray analysis has confirmed previous knowledge that at ordinary temperature four different stable phases appear in this system.

Copper-Cadmium. The Constitution of the Alloys of Copper and Cadmium, C. H. M. Jenkins and D. Hanson. Inst. Metals—advance paper, no. 8, for meeting Mar. 12–13, 1924, 16 pp., 33 figs. Deals with determination of constitution of alloys of cadmium with copper, especially in solid state; copper and cadmium in liquid state are mutually soluble in all proportions.

Copper-Tin. On the Equilibrium Diagram of the Copper-Tin System, T. Isihara. Inst. Metals—advance paper, no. 7, for meeting Mar. 12–13, 1924, 31 figs. Equilibrium diagram of copper-tin system is obtained by means of electric resistance measurement; alpha constituent shows progressive transformation beginning at 480 to 580 deg. cent. according to concentration of tin; maximum solubility of tin in alpha is determined to be 11 per cent at room temperature.

Copper-Zinc. On the Copper-Zinc Alloys Which Expand on Solidification, Kei Iokibe. Inst. Metals—advance paper, no. 6, for meeting Mar. 12–13, 1924, 27 pp., 12 figs. Amount of expansion depends upon percentage of copper and rate of cooling; force of expansion is of considerable magnitude; hardness and elastic limit of expanded alloys are low, and contain cracks and voids; inverse segregation and how its effect can be diminished; cause of inverse segregation.

CORROSION

Zinc and Lead. The Relative Corrosion of Zinc and Lead in Solutions of Inorganic Salts, J. N. Friend and J. S. Tidmus. Inst. Metals—advance paper, no. 4, for meeting Mar. 12–13, 1924, 9 pp., 4 figs. Influence of alkali salts upon relative rates of corrosion of zinc and lead closely resembles that already observed in case of iron; satisfactory explanation can be offered to account for this.

COST ACCOUNTING

Executives. Industrial Cost Accounting for Executives, P. M. Atkins. Am. Mach., vol. 60, nos. 6, 7, 9, 10, 11 and 12, Feb. 7, 21, 28, Mar. 6, 13 and 20, 1924, pp. 201–204, 287–290, 329–333, 353–356, 403–406 and 433–434, 1 fig. Feb. 7: Standard practice instructions; installing system of cost accounts. Feb. 21: Design of forms to be used in facilitating keeping of cost records. Feb. 28: Coördination of cost records and general accounts. Mar. 6: Cost statistics and two methods of their visualized presentation; comparative reports. Mar. 13: Cost-accounting service to production control; auditing work of planning department; comparative cost data for foreman. Mar. 20: factory control by means of cost accounts; analyzing qualities of executive.

Inventory Methods. Keeping Perpetual Plant Inventory, W. C. Sponenburg. Telephony, vol. 86, no. 7, Feb. 16, 1924, pp. 21–23. Method, employed by Glen Telephone Co., Gloversville, N. Y., found most helpful in preparing reports for state tax and public-service commissions. Paper read before N. Y. Up-State Telephone Assn.

Job Costing. A Simple System of Job Costing. Mar. Engr. & Nav. Architect, vol. 47, no. 557, Feb. 1924, pp. 66–67, 2 figs. Costing as a science; cost-recording essentials; labor rate and materials rate; prime cost cards.

COUPLINGS. See CLUTCHES.

CRANES.

Combination Pile Driver and. Combination Heavy Duty Crane and Pile Driver. Ry. Age, vol. 76, no. 15, Mar. 15, 1924, pp. 757–758, 2 figs. Machine built by Brown Hoisting Co. for Northern Pacific is capable of driving piles straight ahead or on either side of track; it may be revolved 360 deg. in either direction and piles may be driven at any point within circumference of 32-ft. circle.

Electric. Electric Level-Luffing Cranes, W. A. Perry. Elec. Rev., vol. 94, no. 2412, Feb. 15, 1924, pp. 248–249, 2 figs. Describes 7-ton dockside cranes supplied to Ardrossan Harbor Co., Scotland.

CUPOLAS

Practice. A Day at the Cupola, A. R. Bartlett. Foundry Trade Jl., vol. 29, no. 389, Jan. 31, 1924, pp. 89–92. Describes operations of a day at cupola of foundry with which author is connected. See Discussion in Foundry Trade Jl., Feb. 7, 1924, pp. 113–116, 1 fig.

CURVES

Fitting. The Development of a Frequency Function and Some Comments of Curve Fitting, E. B. Wilson. Nat. Acad. Sci.—Proc., vol. 10, no. 2, Feb. 1924, pp. 79–84, 2 figs. Author describes method of determining his own fit which, he claims, has desirable characteristic that it suggests at once a working hypothesis.

CYLINDERS

Castings for. Cylinder Castings, O. Smalley. North-East Coast Instn. Engrs. & Shipbldrs.—advance paper no. 2669S, for meeting, Feb. 1, 1924, 30 pp., 26 figs. Deals with cause and elimination of commoner defects encountered in manufacture of cylinder castings.

D

DIESEL ENGINES

Bethlehem. The Bethlehem Two Cycle Diesel Engine. Mar. News, vol. 10, no. 10, Mar. 1924, pp. 75–78 and 95, 11 figs. Particulars of new Bethlehem oil engine which is of vertical, two-stroke cycle, single-acting type, constructed in units of 4, 6 or 8 cylinders and running at a speed of from 116 r.p.m. for land power and twin-screw marine installations down to 90 r.p.m. for single-screw marine use. Notes on 6-cylinder two-cycle oil engine developing 2500 s.hp. at 90 r.p.m., installed on motorship Cubore.

Combustion Phenomena in. Combustion Phenomena in Diesel Engines (Verbrennungsvorgänge im Dieselmotor), H. v. Wartenberg. Zeit. des Vereines deutscher Ingenieure, vol. 68, no. 7, Feb. 16, 1924, pp. 153–154. Explains cause for poorer ignition and tendency to soot formation with burning of tar oils in Diesel engines, and points out that combustion can be accelerated by much finer breaking up of drops, probably through admixture of large quantities of water emulged in oil, and through employment of higher temperatures in compression space.

Heat Losses. Investigations of Diesel Engines (Untersuchungen an der Dieselmaschine), K. Neumann. Zeit. des Vereines deutscher Ingenieure, vol. 68, no. 4, Jan. 26, 1924, pp. 77–80, 5 figs. Thermodynamic circle process and working losses; heat diagrams of engine for complete and incomplete expansion; calculation of heat-transmission coefficient for combustion and expansion independent of piston diagram.

Heavy-Oil, for Motorcycles. A New Heavy-Oil Engine for Motorcycles (Ein neuer Fahrzeug-Schweröl-motor), E. Frey and C. Fischer. Motorwagen, vol. 27, no. 2–3, Jan. 20–31, 1924, pp. 28–29, 2 figs. Describes compressorless Diesel engine which can be operated with all kinds of oil fuel, including crude, paraffin, lignite-tar and shale oil, as well as with light fuel oils, such as gasoline, benzol, alcohol and petroleum, without making any changes in engine.

Knudsen. Knudsen Diesel. Pac. Mar. Rev., vol. 21, no. 2, Feb. 1924, p. 115, 3 figs. Two-cycle engine of opposed-piston type, but with cylinders set on acute angle with common combustion chamber at their upper end.

Marine. Plan New Diesel for Big Output. Mar. Rev., vol. 54, no. 3, Mar. 1924, pp. 114–116, 5 figs.

Manufactured by Advertisers — CLASSIFIED LIST OF MECHANICAL EQUIPMENT — Alphabetical List on page 174

* Titusville Iron Works Co.
* Troy Engine & Machine Co.
* Vilter Mfg. Co.
* Westinghouse Electric & Mfg. Co.
* Wheeler, C. H. Mfg. Co.

Engines, Steam, Automatic
* American Blower Co.
* Clarage Fan Co.
* Engberg's Electric & Mech. Wks.
* Erie City Iron Works
* Harrisburg Fdry. & Mach. Wks.
* Leffel, James & Co.
Ridgway Dynamo & Engine Co.
* Skinner Engine Co.
* Sturtevant, B. F. Co.
* Troy Engine & Machine Co.
* Westinghouse Electric & Mfg. Co.

Engines, Steam, Corliss
* Allis-Chalmers Mfg. Co.
* Franklin Machine Co.
* Frick Co. (Inc.)
* Harrisburg Fdry. & Mach. Wks.
Mackintosh-Hemphill Co.
* Nordberg Mfg. Co.
* Vilter Mfg. Co.

Engine, Steam, High Speed
* American Blower Co.
* Clarage Fan Co.
* Engberg's Electric & Mech. Wks.
* Erie City Iron Works
* Harrisburg Fdry. & Mach. Wks.
* Nordberg Mfg. Co.
Ridgway Dynamo & Engine Co.
* Skinner Engine Co.

Engines, Steam, Poppet Valve
* Erie City Iron Works
* Nordberg Mfg. Co.
Ridgway Dynamo & Engine Co.
* Vilter Mfg. Co.

Engines, Steam, Throttling
* American Blower Co.
* Clarage Fan Co.
* Engberg's Electric & Mech. Wks.
Ridgway Dynamo & Engine Co.

Engines, Steam, Una-Flow
* Frick Co. (Inc.)
* Harrisburg Fdry. & Mach. Wks.
* Nordberg Mfg. Co.
Ridgway Dynamo & Engine Co.
* Skinner Engine Co.

Engines, Steam, Variable Speed
* American Blower Co.
* Harrisburg Fdry. & Mach. Wks.
* Nordberg Mfg. Co.
Ridgway Dynamo & Engine Co.

Engines, Steam, Vertical (Fully Enclosed, Self-Oiling)
* American Blower Co.
* Clarage Fan Co.
* Engberg's Electric & Mech. Wks.
* Troy Engine & Machine Co

Engines, Steering
Bethlehem Shipbldg.Corp'n (Ltd.)
Lidgerwood Mfg. Co

Evaporators
Bethlehem Shipbldg.Corp'n (Ltd.)
* Croll-Reynolds Engrg. Co. (Inc.)
Farrel Foundry & Machine Co.
* Vogt, Henry Machine Co.
* Wheeler Condenser & Engrg. Co.

Excavating Machinery
Clyde Iron Works Sales Co.
Lidgerwood Mfg. Co.
Link-Belt Co.

Exhaust Heads
Hoppes Mfg. Co.

Exhaust Systems
* Allington & Curtis Mfg. Co.
* American Blower Co.
* Clarage Fan Co.
* Sturtevant, B. F. Co.

Exhausters, Gas
* American Blower Co.
* Clarage Fan Co.
* General Electric Co.
* Green Fuel Economizer Co.
* Schutte & Koerting Co.
* Sturtevant, B. F. Co.

Extractors, Centrifugal
Fletcher Works
Tolhurst Machine Works

Extractors, Oil and Grease
* American Schaeffer & Budenberg Corp'n
* Kieley & Mueller (Inc.)

Extractors, Screw
* Cleveland Twist Drill Co.

Fans, Exhaust
* American Blower Co.
* Clarage Fan Co.
* Coppus Engineering Corp'n
* General Electric Co.
* Green Fuel Economizer Co.
* Sturtevant, B. F. Co.

Fans, Exhaust, Mine
* American Blower Co.
* Sturtevant, B. F. Co.

Feeders, Pulverized Fuel
* Combustion Engineering Corp'n
Grindle Fuel Equipment Co.
Holbeck Engrg. Co.
* Smidth, F. L. & Co.

Filters, Air
Reed Air Filter Co. (Inc.)

Filters, Feed Water, Boiler
* Permutit Co.

Filters, Feed Water, Demulsifying
* Permutit Co.

Filters, Gravity
* Permutit Co.

Filters, Mechanical
* Permutit Co.

Filters, Oil
* Bowser, S. F. & Co. (Inc.)
Elliott Co.
* General Electric Co.
Nugent, Wm. W. & Co. (Inc.)
* Permutit Co.

Filters, Pressure
* Graver Corp'n
* Permutit Co.

Filters, Water
* Cochrane Corp'n
Elliott Co.
* Graver Corp'n
* Permutit Co.
* Scaife, Wm. B. & Sons Co.

Filtration Plants
* Cochrane Corp'n
* Graver Corp'n
International Filter Co.
* Permutit Co.
* Scaife, Wm. B. & Sons Co.

Fire Brick, Fire Hydrants, etc.
(See Brick, Hydrants, Fire, etc.)

Fittings, Ammonia
* Crane Co.
* De La Vergne Machine Co.
* Frick Co. (Inc.)
* Vilter Mfg. Co.
* Vogt, Henry Machine Co.

Fittings, Compression
* Bowser, S. F. & Co. (Inc.)
Lunkenheimer Co.

Fittings, Flanged
* Builders Iron Foundry
* Central Foundry Co.
* Crane Co.
* Edward Valve & Mfg. Co.
Kennedy Valve Mfg. Co.
Lunkenheimer Co.
* Pittsburgh Valve, Fdry. & Const. Co.
* Reading Steel Casting Co. (Inc.)
(Reading Valve & Fittings Div.)
* U. S. Cast Iron Pipe & Fdry. Co.
* Vogt, Henry Machine Co.

Fittings, Hydraulic
* Crane Co.
* Pittsburgh Valve, Fdry. & Const. Co.
* Reading Steel Casting Co. (Inc.)
(Reading Valve & Fittings Div.)
* Vogt, Henry Machine Co.

Fittings, Pipe
* Barco Mfg. Co.
Bethlehem Shipbldg.Corp'n (Ltd.)
* Central Foundry Co.
* Crane Co.
Kennedy Valve Mfg. Co.
Lunkenheimer Co.
* Pittsburgh Valve, Fdry. & Const. Co.
* Reading Steel Casting Co. (Inc.)
(Reading Valve & Fittings Div.)
Steere Engineering Co.
* Vogt, Henry Machine Co

Fittings, Steel
* Crane Co.
* Edward Valve & Mfg. Co.
Lunkenheimer Co.
* Pittsburgh Valve, Fdry. & Const. Co.
* Reading Steel Casting Co. (Inc.)
(Reading Valve & Fittings Div.)
Steere Engineering Co.
* Vogt, Henry Machine Co.

Flanges
* American Spiral Pipe Works
* Crane Co.
* Edward Valve & Mfg. Co.
Kennedy Valve Mfg. Co.
Lunkenheimer Co.
* Pittsburgh Valve, Fdry. & Const. Co.
* Reading Steel Casting Co. (Inc.)
(Reading Valve & Fittings Div.)
* Vogt, Henry Machine Co.

Flanges, Forged Steel
Cann & Saul Steel Co.

Floats, Copper
* Reliance Gauge Column Co.

Floor Armor
* Irving Iron Works Co.

Floor Stands
* Chapman Valve Mfg. Co.
* Crane Co.
Hill Clutch Mach. & Fdry. Co.
* Jones, W. A. Fdry. & Mach. Co.
Kennedy Valve Mfg. Co.
Lunkenheimer Co.
* Pittsburgh Valve, Fdry. & Const. Co.
* Reading Steel Casting Co. (Inc.)
(Pratt & Cady Division)
* Royersford Fdry. & Mach. Co.
* Schutte & Koerting Co.
* Wood's, T. B. Sons Co.

Flooring-Grating
* Irving Iron Works Co.

Flooring, Metallic
* Irving Iron Works Co.

Flooring, Rubber
* United States Rubber Co.

Flour Milling Machinery
* Allis-Chalmers Mfg. Co.

Flue Gas Analysis Apparatus
* Tagliabue, C. J. Mfg. Co.

Fly Wheels
Hill Clutch Machine & Fdry. Co.
* Medart Co.
* Nordberg Mfg. Co.
* Wood's, T. B. Sons Co.

Fonts, Outdoor Bubble
Murdock Mfg. & Supply Co.

Forgings, Drop
* Vogt, Henry Machine Co.

Forgings, Hammered
Cann & Saul Steel Co.

Forgings, Iron and Steel
Cann & Saul Steel Co
McMyler-Interstate Co.

Foundry Equipment
* Whiting Corp'n

Friction Clutches, Hoists, etc.
(See Clutches, Hoists, etc., Friction)

Friction Drives
Rockwood Mfg. Co.

Frictions, Paper and Iron
Link-Belt Co.
Rockwood Mfg. Co.

Fuel Economizers
(See Economizers, Fuel)

Furnace Construction
Furnace Engineering Co.

Furnaces, Annealing and Tempering
* General Electric Co.
* Kenworthy, Chas. F. (Inc.)
* Whiting Corp'n

Furnaces, Boiler
* American Engineering Co.
* American Spiral Pipe Wks.
* Babcock & Wilcox Co.
* Bernitz Furnace Appliance Co.
* Combustion Engineering Corp'n
* Detroit Stoker Co.
* Riley, Sanford Stoker Co.

Furnaces, Case Hardening
* Kenworthy, Chas. F. (Inc.)

Furnaces, Down Draft
* O'Brien, John Boiler Works Co.

Furnaces, Electric
Detroit Electric Furnace Co.
* Kenworthy, Chas. F. (Inc.)
* Westinghouse Elect. & Mfg. Co.

Furnaces, Forging
* Kenworthy, Chas. F. (Inc.)

Furnaces, Hardening
* Kenworthy, Chas. F. (Inc.)

Furnaces, Heat Treating
* General Electric Co.
* Kenworthy, Chas. F. (Inc.)

Furnaces, Melting
Detroit Electric Furnace Co.
* General Electric Co.
* Whiting Corp'n

Furnace, Non-Ferrous
Detroit Electric Furnace Co.

Furnaces, Non-Oxidizing
* Kenworthy, Chas. F. (Inc.)

Furnaces, Powdered Coal
Grindle Fuel Equipment Co.

Furnaces, Smokeless
* American Engineering Co.
* Babcock & Wilcox Co.
* Combustion Engineering Corp'n
* Detroit Stoker Co.
* Riley, Sanford Stoker Co.

Fuses
* General Electric Co.
Johns-Manville (Inc.)
* Westinghouse Elect. & Mfg. Co.

Gage Boards
* American Schaeffer & Budenberg Corp'n
* Ashton Valve Co.
* Crosby Steam Gage & Valve Co.

Gage Glasses
* American Schaeffer & Budenberg Corp'n

Gage Glasses, Inclined
Sesure Water Gauge Co.

Gage Testers
* American Schaeffer & Budenberg Corp'n
* Ashton Valve Co.
* Crosby Steam Gage & Valve Co.

Gages, Altitudes
* American Schaeffer & Budenberg Corp'n
* Ashton Valve Co.
* Crosby Steam Gage & Valve Co.

Gages, Ammonia
* American Schaeffer & Budenberg Corp'n
* Ashton Valve Co.
* Crosby Steam Gage & Valve Co.
* Vogt, Henry Machine Co.

Gages, Differential Pressure
* American Schaeffer & Budenberg Corp'n
Bacharach Industrial Instrument Co.
* Bailey Meter Co.
* Tagliabue, C. J. Mfg. Co.
* Uehling Instrument Co.

Gages, Draft
* American Schaeffer & Budenberg Corp'n
* Ashton Valve Co.
Bacharach Industrial Instrument Co.
* Bailey Meter Co.
* Bristol Co
* Tagliabue, C. J. Mfg. Co.
* Taylor Instrument Cos.
* Uehling Instrument Co.

Gages, Drill, Tap and Wires
* Cleveland Twist Drill Co.

Gages, Hydraulic
* American Schaeffer & Budenberg Corp'n
* Ashton Valve Co.
* Crosby Steam Gage & Valve Co.

Gages, Liquid Level
* Bristol Co.
Lunkenheimer Co.
* Simplex Valve & Meter Co.

Gages, Loss of Head
* Builders Iron Foundry
* Simplex Valve & Meter Co.

Gages, Measuring (Surface, Depth, Dial, etc.)
* Norma Co. of America

Gages, Pressure
* American Schaeffer & Budenberg Corp'n
* Ashton Valve Co.
Bacharach Industrial Instrument Co.
* Bailey Meter Co.
* Bristol Co.
* Crosby Steam Gage & Valve Co.
* Tagliabue, C. J. Mfg. Co.
* Uehling Instrument Co.

Gages, Rate of Flow
Bacharach Industrial Instrument Co.
* Bailey Meter Co.
* Builders Iron Foundry
* Simplex Valve & Meter Co.

Gages, Syphon
* Tagliabue, C. J. Mfg. Co.

Gages, Vacuum
* American Schaeffer & Budenberg Corp'n
* Ashton Valve Co.
Bacharach Industrial Instrument Co.
* Bristol Co.
* Crosby Steam Gage & Valve Co.
* Tagliabue, C. J. Mfg. Co.
* Taylor Instrument Cos.
* Uehling Instrument Co.

Gages, Water
* American Schaeffer & Budenberg Corp'n
* Ashton Valve Co.
* Bristol Co.
* Crane Co.
* Jenkins Bros.
Lunkenheimer Co.
* Reading Steel Casting Co. (Inc.)
(Pratt & Cady Division)
* Reliance Gauge Column Co.
* Simplex Valve & Meter Co.

*Catalogue data of firms marked * appear in the A.S.M.E. Condensed Catalogues of Mechanical Equipment, 1923-24 Volume*

Description of 6-cylinder 4-cycle crosshead-type Diesel engine developing 2000 i.hp. at a maximum of 100 r.p.m. with a 30-in. bore and 48-in. stroke, installed on Suphenco.

The Maintenance of Marine Internal-Combustion Engines. Mar. Engr. & Nav. Architect, vol. 47, no. 557, Feb. 1924, pp. 53–54. Working and operation of marine Diesel engines considered practically.

Opposed-Piston. Palmer's 3,000 s.h.p. Opposed-Piston Diesel Engine. Motorship, vol. 9, no. 2, Feb. 1924, pp. 118–119, 1 fig. Single-screw unit for 10,000-ton single-screw tanker, constructed on Fullagar principle with air injection.

Pipe-Line, Lubrication of. Pipe Line Diesels and Their Lubrication, F. Thilenius. Oil Engine Power, vol. 2, no. 2, Feb. 1924, pp. 67–76, 13 figs. Developments carried out on Prairie Pipe Lines. Describes new system which utilizes all available exhaust heat in conjunction with reclaimers, purifiers, and special filters, combined into standard units and eliminates all lubricating troubles.

Valve Setting. Setting the Valves of a Diesel Engine, H. F. Birnie and R. C. Baumann. Power Plant Eng., vol. 28, no. 4, Feb. 15, 1924, pp. 230–232, 6 figs. Setting fuel cams.

DISKS

Rotating, Calculation of. Calculation of Rotating Disks (Le Calcul des disques tournants), P. Caufourier. Génie Civil, vol. 84, no. 1, Jan. 5, 1924, pp. 15–17, 4 figs. Discusses Prudon, Pigeaud, and Stodola-Arrowsmith methods and describes rational method of employing Arrowsmith calculation.

DRILLING MACHINES

Multiple-Spindle. Multiple-spindle Drilling Machines. Machy. (Lond.), vol. 23, no. 593, Feb. 7, 1924, pp. 609–612, 6 figs. New tools operating on time cycle, more particularly for operation on railway-car details.

DURALUMIN

Improvement Process. The Researches on the Duraluminum Problem, W. Fraenkel and E. Scheuer. Testing, vol. 1, no. 1, Jan. 1924, pp. 33–39. Explains peculiarity of process of improvement, and gives hypothesis reached by authors, namely, that cause of improvement is explained as chemical reaction in quenched alloy taking place in forming solid solution.

DYNAMOMETERS

Types. Some New Dynamometers, J. S. G. Primrose. Mech. World, vol. 75, no. 1936, 1937 and 1938, Feb. 8, 15 and 22, pp. 87–88, 100–102, and 115–116, 7 figs. Review of some of the more modern means of measuring force, contrasting them with some of the older forms which are better known. Paper read before Manchester Assn. of Engrs.

E

ELECTRIC DRIVE

Machine Tools. A New Reversing-Gear Arrangement for Individual Electric Drives (Eine neue Umsteuergetriebeanordnung für elektrischen Einzelantrieb), E. Lauer-Schmaltz. Maschinenbau, vol. 24, no. 8, Jan. 24, 1924, pp. 203–206, 7 figs. Describes two different designs of new type of motor, the flywheel ring motor, which together with a new system of mechanical reversing arrangement, offers advantages for transmission of larger amounts of power.

ELECTRIC FURNACES

Heat Treating. Electric Furnace Proves Best, J. Watson. Elec. World, vol. 83, no. 8, Feb. 23, 1924, p. 376, 1 fig. Special application for hardening clipper plates proves very economical; costs and operating results.

ELECTRIC LOCOMOTIVES

Paris-Orleans Ry. High Speed Passenger Locomotive for Paris-Orleans Railway, W. D. Bearce. Gen. Elec. Rev., vol. 27, no. 3, Mar. 1924, pp. 146–150, 3 figs. Detailed description of gearless 120-ton locomotive; nominal voltage of system 1500 volts d.c.

Siemens-Schuckert. The Siemens-Schuckert Locomotives on the Swedish Riksgränsbahn (Die Siemens-Schuckert-Lokomotiven auf der schwedischen Riksgränsbahn), F. Kuntze. Zeit. des Vereines deutscher Ingenieure, vol. 68, no. 4, Jan. 26, 1924, pp. 72–76, 21 figs. Brief outline of first 1C + C1 locomotives of Swedish railway and results obtained therewith; description of new 1C + C1 locomotives and their ability to meet stringent requirements made on them.

The Siemens-Schuckert-Locomotives of the Swedish State Railways (Riksgränsbahn), F. Kuntze. Eng. Progress, vol. 5, no. 1, Jan. 1924, pp. 1–4, 6 figs. Details of ore-train twin locomotives of 1C + C1 type.

Vibrations. The Vibrations on Electric Locomotives with Crank Drive (Die Schütteleerscheinungen elektrischer Lokomotiven mit Kurbelantrieb), Iwan Döry. Elektrotechnik u. Maschinenbau, vol. 42, no. 4, Jan. 27, 1924, pp. 45–47, 3 figs. Discusses causes of periodic vibration and indicates that play in bearings is largely responsible for it; fact that vibrations occur under no load as well as at full load tends to support authors' conclusions; use of properly placed springs in gear mechanism is means for avoiding vibrating and resonating phenomena.

ELECTRIC WELDING

Precision. One More Step in Electric Welding Progress, S. W. Mann. Am. Welding Soc.—Jl., vol. 3, no. 1, Jan. 1924, pp. 18–23, 2 figs. Discusses precision welding; describes process of repairing a crankshaft, which was accomplished at very great saving.

ELECTRIC WELDING, ARC

Problems and Uses. Electric Arc Welding (Aus der Werkstatt des Lichtbogenschweissers), A. Hochstimm. Zeit. des Vereines deutscher Ingenieure, vol. 68, no. 6, Feb. 9, 1924, pp. 129–132, 18 figs. Discusses useful field of arc welding; peculiarities of d.c. and a.c. arc welding; training of welders; and results obtained.

Sheet-Metal Parts. Arc Welding Sheet-Metal Parts, A. R. Luechinger. Am. Mach., vol. 60, no. 12, Mar. 20, 1924, pp. 425–427, 6 figs. What constitutes good welding; proper methods of welding different kinds of seams; how operators should be trained; use of fixtures in production welding.

Welders, Training of. Training Course for Electric Arc Welders. Am. Welding Soc.—Jl., vol. 3, no. 2, Feb. 1924, pp. 15–47. Analysis of work of an arc welder; qualifications for welders; some of the fundamentals in arc welding, together with a detailed statement of material classified under type welding jobs arranged in order of difficulty from standpoint of teaching.

ELEVATORS

Hand and Power. The Design and Construction of Hand and Power Elevators. Mech. Wld., vol. 75, nos. 1932, 1934, 1937 and 1939, Jan. 11, 25, Feb. 15 and 29, 1924, pp. 24–25, 49–51, 98–100 and 129–130, 13 figs. Deals with elevators for raising or lowering goods of solid form between basement and intervening floors of a building or factory.

EMPLOYEES

Individual Differences of. What Makes Employees Differ? D. A. Laird. Indus. Mgt. (N. Y.), vol. 67, no. 3, Mar. 1924, pp. 184–190, 5 figs. Discusses from point of view of present-day science factors connected with individual differences with which employer should be familiar.

EMPLOYEES, TRAINING OF

Evening School. Helping the Worker by Education, S. W. Ashe. Machy. (N. Y.), vol. 30, no. 7, Mar. 1924, pp. 524–525. How evening school at Pittsfield Works of Gen. Elec. Co. provides educational opportunities for employees.

ENAMELING

Cast-Iron Ware. European Practice in the Manufacture of Enameled Cast Iron Ware, J. Grunwald. Am. Ceramic Soc.—Jl., vol. 7, no. 2, Feb. 1924, pp. 118–121. Review of European practice, particularly as employed in Austria and Germany.

ENERGY

Conservation. New Ways of Conserving Energy (Neue Wege der Energiewirtschaft), Löffler. Zeit. des Vereines deutscher Ingenieure, vol. 68, no. 8, Feb. 23, 1924, pp. 161–169, 18 figs. Present-day utilization of fuel energy; examples from mining and metallurgical, chemical and automotive industries; saving effected through high speed, high pressure and temperature drops; control of state of heat, especially through cooling; Diesel engines for trucks; electrical and mechanical power transmission in automobiles; gas and oil turbines; high-pressure steam turbines and boilers; use of high pressure and high temperature in chemical industry—refinement of fuel, liquefaction of coal; principles of modern high-pressure design and operation.

Utilization of Natural Sources. Contribution to the Theory of the Utilization of Natural Power Sources (Beitrag zur Theorie der Ausnützung von Naturkräften), Rob. I. Novotny. Zeit. des Vereines deutscher Ingenieure, vol. 68, no. 5, Feb. 2, 1924, pp. 101–106, 11 figs. Influence of working time and idleness of power plant on utilization of energy contained in a natural power source; improving power utilization and increasing efficiency by use of energy storage; comparison of cost of power generation with and without storage of energy.

ENGRAVING MACHINES

Design. Engraving Machines (Graviermaschinen), L. Braren. Werkstattstechnik, vol. 18, no. 3, Feb. 1, 1924, pp. 47–51, 15 figs. Study of construction elements peculiar to such machines and information on a number of new solutions of problems involved.

F

FANS

Mine. Experiments on the Distribution of Air in Centrifugal Fans and on Re-entry Phenomena, H. Briggs and J. M. Williamson. Colliery Guardian, vol. 127, no. 3295, Feb. 22, 1924, pp. 465–466, 21 figs. Experiments made at Heriot-Watt College, Edinburgh, and at Wellesley Colliery, Fife, bearing upon manner in which centrifugal fan of drum type deals with air it discharges; shows how uneven is distribution of air passing through wheel; different forms of re-entry of air. Paper read before North of Eng. Inst. Min. & Mech. Engrs.

Support and Drive. Auxiliary Equipment for Blast and Ventilating Fans, Chas. L. Hubbard. Power, vol. 59, no. 9, 26, 1924, pp. 318–321, 6 figs. Methods of supporting fan and drive to meet various conditions; preventing vibration; air velocities; engine and turbine drives; d.c. and a.c. motor drives; speed regulation with motor drive.

Ventilators and Exhausters. Ventilators and Exhausters (Ventilatoren und Exhaustoren), H. R. Karg. Praktischer Maschinen-Konstrukteur, vol. 56, nos. 46–47 and 50–51, Nov. 27 and Dec. 24, 1923, and vol. 57, nos. 1–2 and 5, Jan. 8 and Feb. 5, 1924, 13 pp., 3 figs. Nov. 27: Critical discussion and recommendations. Dec. 24: Openings and admission velocities. Jan. 8: Determination of inside and outside blade angles. Feb. 5: Determination of speed of admission of gases in vane wheel.

FERROALLOYS

Development and Uses. Ferro-Alloys, Fr. M. Becket. Chem. & Met. Eng., vol. 30, nos. 5, 8 and 10, Feb. 4, 25 and Mar. 10, 1924, pp. 186–188, 316–318 and 391–393. Feb. 4: Story and uses of ferro-silicon; status of industry; metallic silicon. Feb. 25: Developments and utility of ferrochromium. Mar. 10: Ferroalloys of tungsten and vanadium.

FLOUR MILLS

Diesel-Engine-Driven. America's Largest Diesel-Driven Flour Mill. Oil Engine Power, vol. 2, no. 2, Feb. 1924, pp. 80–84, 4 figs. How Red Star Mill, Wichita, Kans., effected pronounced economies by gradually discarding old steam machinery in favor of modern oil-engine power, which rendered them independent of local electric supply.

FLOW OF WATER

Pipes and Channels. The Flow of Water in Pipes and Channels, F. Heywood. Instn. Civ. Engrs.—Sessional Notices, no. 3, Feb. 1924, pp. 67–68. Attempt to coördinate available data relating to flow of water in conduits with entirely satisfactory results of tests on small-scale experimental pipe lines. (Abstract.)

FLOWMETERS

Electrically-Operated. The Electrically Operated Flow Meter, R. E. Woolley. Gen. Elec. Rev., vol. 27, no. 3, Mar. 1924, pp. 182–187, 8 figs. Reasons that gave rise to its development; description of complete device, function of its parts, its general principle of operation, and its applications.

FOREMEN

Training. Some Psychological Aspects of Foremanship Training, F. Cushman. Indus. Mgt. (N. Y.), vol. 67, no. 3, Mar. 1924, pp. 174–176. Responsibilities of foremen and methods of discharging them.

FORGING

Copper. Distillery Apparatus in a Coppersmithing Shop, H. P. Armson. Can. Machy., vol. 31, no. 10, Mar. 6, 1924, pp. 27–30, 3 figs. Description of methods employed in making large sectional drums, pipe connections, etc., at Booth-Coulter Copper & Brass Co.'s plant, Toronto, Can.

Steel Shafts. The Rough Turning of Forgings (De dégrossissage des pièces de forge sur le tour), N. Sawine. Génie Civil, vol. 84, no. 5, Feb. 2, 1924, pp. 110–112. Discusses best working conditions for steel shafts.

FOUNDRIES

American vs. European Practice. American Versus European Foundry Practice, H. M. Lane. Iron Age, vol. 113, no. 11, Mar. 13, 1924, pp. 803–804. Comparison based on relative, social and economic conditions; light building construction; machine-tool design.

Brass. Impressions of British Brass Foundries, T. Harper. Metal Industry (N. Y.), vol. 22, no. 2, Feb. 1924, pp. 60–63. British efficiency as seen by an American brass foundryman and jobbing foundry operator.

Flasks. Notes on Moulding Boxes, G. Hoffmann. Foundry Trade Jl., vol. 29, no. 391, Feb. 14, 1924, pp. 129–131, 19 figs. Requirements and design of flasks; design of bars; wrought-iron flasks. Translated from Die Giesserei.

Pneumatic Tools. Increasing Foundry Output With Compressed Air, R. G. Skerrett. Can. Foundryman, vol. 15, no. 2, Feb. 1924, pp. 22–27, 18 figs. How compressed air and pneumatic tools make it possible for foundryman to do more and better work than would be possible without these modern aids.

FREIGHT HANDLING

L. C. L. Freight. Departure in Handling Less than Carload Freight, E. F. Ford. Ry. Rev., vol. 74, no. 8, Feb. 23, 1924, pp. 320–321. Description of new method which reduces overtime, loss and damage and conserves equipment.

How English Cartage Practice Prevents Terminal Congestion, F. C. Horner. N. Y. Railroad Club-Official Proc., vol. 34, no. 3, Feb. 1924, pp. 7212–7222 and (discussion) 7222–7225. Description of English system of collection and delivery of l.c.l. freight.

FUELS

Factory Refuse. Generation of Power with Factory Refuse, F. Johnstone-Taylor. Power Plant Eng., vol. 28, no. 6, Mar. 15, 1924, pp. 326–328, 3 figs. Wood wastes and other refuse used for generating steam and producer gas; description of suction-gas producer; operating results; gas storage, boiler firing by gas.

Research. The Work of the Fuel Research Board, C. H. Lander. Instn. Min. Engrs.—Trans., vol. 64, Pt. 5, Feb. 1924, pp. 243–253 and (discussion) 253–261. Physical and chemical survey of national coal resources; carbonization of coal; structure of coke; water gas; gasoline mixtures for motor-car engines; hydrogenation of oils and coals; domestic heating; peat; alcohol; etc.

[See also COAL; OIL FUELS; PULVERIZED COAL.]

FURNACES, ANNEALING

Steel Wire. Furnaces for Wire Annealing. Fuels & Furnaces, vol. 2, no. 3, Mar. 1924, pp. 245–246, 4 figs. Coal-fired pot furnaces for black and bright annealing and recuperative furnaces of German design

FURNACES, HEATING

Sheet and Pair. Modern Sheet and Pair Furnaces

Manufactured by Advertisers — CLASSIFIED LIST OF MECHANICAL EQUIPMENT — Alphabetical List on page 174

Gages, Water Level
* American Schaeffer & Budenberg Corp'n
* Bristol Co.
Lunkenheimer Co.
* Simplex Valve & Meter Co.

Gas Plant Machinery
* Cole, R. D. Mfg. Co.
Steere Engineering Co.

Gaskets
Garlock Packing Co.
* Jenkins Bros.
Johns-Manville (Inc.)
* Sarco Co. (Inc.)

Gaskets, Iron, Corrugated
Smooth-On Mfg. Co.

Gaskets, Rubber
Garlock Packing Co.
* Goodrich, B. F. Rubber Co.
* United States Rubber Co.

Gates, Ash
Baker Dunbar Co.

Gates, Blast
* American Blower Co.
Steere Engineering Co.

Gates, Cut-off
Easton Car & Construction Co.
Link-Belt Co.

Gates, Sluice
* Chapman Valve Mfg. Co.
* Pittsburgh Valve, Fdry. & Const. Co.

Gear Blanks
Cann & Saul Steel Co.

Gear Cutting Machines
* Jones, W. A. Fdry. & Mach. Co.

Gear Hobbing Machines
* Jones, W. A. Fdry. & Mach. Co.

Gears, Bakelite
Ganschow, Wm. Co.

Gears, Cut
* Brown, A. & F. Co.
Chain Belt Co.
Hill Clutch Machine & Fdry. Co.
* De Laval Steam Turbine Co.
Farrel Foundry & Machine Co.
* Fawcus Machine Co.
* Foote Bros. Gear & Machine Co.
* James, D. O. Mfg. Co.
Johnson, Carlyle Machine Co.
* Jones, W. A. Fdry. & Mach. Co.
Link-Belt Co.
Mackintosh-Hemphill Co.
* Medart Co.
Philadelphia Gear Works

Gears, Fibre
* General Electric Co.
* James, D. O. Mfg. Co.

Gears, Grinding
Farrel Foundry & Machine Co.

Gears, Helical
Farrel Foundry & Machine Co.

Gears, Herringbone
* Falk Corporation
Farrel Foundry & Machine Co.
* Fawcus Machine Co.

Gears, Machine Molded
* Brown, A. & F. Co.
Farrel Foundry & Machine Co.
* Jones, W. A. Fdry. & Mach. Co.
Link-Belt Co.

Gears, Micarta
* Westinghouse Elec. & Mfg. Co.

Gears, Rawhide
Farrel Foundry & Machine Co.
Ganschow, Wm. Co.
* James, D. O. Mfg. Co.
Philadelphia Gear Works

Gears, Speed Reduction
Chain Belt Co.
* De Laval Steam Turbine Co.
* Falk Corporation
Farrel Foundry & Machine Co.
* Fawcus Machine Co.
* Foote Bros. Gear & Machine Co.
Ganschow, Wm. Co.
* General Electric Co.
* James, D. O. Mfg. Co.
* Jones, W. A. Fdry. & Mach. Co.
* Kerr Turbine Co.
Link-Belt Co.
* Sturtevant, B. F. Co.
* Westinghouse Electric & Mfg. Co.

Gears, Steel
Hill Clutch Machine & Fdry. Co.

Gears, Worm
Chain Belt Co.
* Cleveland Worm & Gear Co.
* Fawcus Machine Co.
* Foote Bros. Gear & Machine Co.
Ganschow, Mm. Co.
* Gifford-Wood Co.
* James D. O. Mfg. Co.
* Jones, W. A. Fdry. & Mach. Co.
Link-Belt Co.

Generating Sets
* Allis-Chalmers Mfg. Co.
* American Blower Co.
* Clarage Fan Co.
* Coppus Engineering Corp'n
* De Laval Steam Turbine Co
* Engberg's Electric & Mech. Wks.
* General Electric Co.
* Kerr Turbine Co.
Ridgway Dynamo & Engine Co.
* Sturtevant, B. F. Co.
* Westinghouse Electric & Mfg. Co.

Generators, Electric
* Allis-Chalmers Mfg. Co.
* De Laval Steam Turbine Co.
* Engberg's Electric & Mech. Wks.
* General Electric Co.
* Nordberg Mfg. Co.
Ridgway Dynamo & Engine Co.
* Westinghouse Electric & Mfg. Co.

Governors, Air Compressor
* Foster Engineering Co.
* Mason Regulator Co.

Governors, Engine, Oil
* Nordberg Mfg. Co.

Governors, Engine, Steam
* Nordberg Mfg. Co.

Governors, Oil Burner
* Foster Engineering Co.
* Mason Regulator Co.

Governors, Pressure
* Tagliabue, C. J. Mfg. Co.

Governors, Pump
* Bowser, S. F. & Co. (Inc.)
* Edward Valve & Mfg. Co.
* Foster Engineering Co.
* Kieley & Mueller (Inc.)
* Mason Regulator Co.
Squires, C. E. Co.
* Tagliabue, C. J. Mfg. Co.

Governors, Steam Turbine
* Foster Engineering Co.

Governors, Water Wheel
* Worthington Pump & Machinery Corp'n

Granulators
* Smidth, F. L. & Co.

Graphite, Flake (Lubricating)
* Dixon, Joseph Crucible Co.

Grate Bars
* Casey-Hedges Co.
* Combustion Engineering Corp'n
* Erie City Iron Works
* Titusville Iron Works Co.
* Vogt, Henry Machine Co.

Grate Bars (for Overfeed and Underfeed Stokers)
Furnace Engineering Co.

Grates, Dumping
* Combustion Engineering Corp'n
* Titusville Iron Works Co.
* Vogt, Henry Machine Co.

Grates, Shaking
* Casey-Hedges Co.
* Combustion Engineering Corp'n
* Erie City Iron Works
* Springfield Boiler Co.
* Titusville Iron Works Co.
* Vogt, Henry Machine Co.

Grating, Flooring
* Irving Iron Works Co.

Grease Cups
(See Oil and Grease Cups)

Grease Extractors
(See Separators, Oil)

Greases
* Dixon, Joseph Crucible Co.
* Royersford Fdry. & Mach. Co.
Vacuum Oil Co.

Grinding Machinery
* Brown, A. & F. Co.
* Smidth, F. L. & Co.

Grinding Machinery, Knife
* American Machine & Foundry Co.

Grinding Machines, Chaser
* Landis Machine Co. (Inc.)

Grinding Machines, Floor
* Builders Iron Foundry
* Royersford Fdry. & Mach. Co.

Grinding Machines, Tool
* National Acme Co.

Gun Metal Finish
* American Metal Treatment Co.

Hammers, Drop
* Franklin Machine Co.
* Long & Allstatter Co.

Hammers, Pneumatic
* Ingersoll-Rand Co.

Handles, Machine, Steel
Rockwood Sprinkler Co.

Hangers, Shaft
* Brown, A. & F. Co.
Chain Belt Co.
* Falls Clutch & Machinery Co.
Hill Clutch Machine & Fdry. Co.
* Jones, W. A. Fdry. & Mach. Co.
Link-Belt Co.
* Medart Co.
* Royersford Fdry. & Mach. Co.
* Wood's, T. B. Sons Co.

Hangers, Shaft (Ball Bearing)
* Hyatt Roller Bearing Co.
* S K F Industries (Inc.)

Hangers, Shaft (Roller Bearing)
* Hyatt Roller Bearing Co.
* Jones, W. A. Fdry. & Mach. Co.

Hard Rubber Products
* United States Rubber Co.

Hardening
* American Metal Treatment Co.

Heat Exchangers
* Croll-Reynolds Engineering Co.

Heat Treating
* American Metal Treatment Co.

Heaters, Feed Water (Closed)
Bethlehem Shipbldg.Corp'n (Ltd.)
* Croll-Reynolds Engineering Co.
* Erie City Iron Works
* Schutte & Koerting Co.
* Walsh & Weidner Boiler Co.
* Wheeler, C. H. Mfg. Co.
* Wheeler Cond. & Engrg. Co.
* Worthington Pump & Machinery Corp'n

Heaters, Feed Water, Locomotive (Open)
* Worthington Pump & Machinery Corp'n

Heaters and Purifiers, Feed Water, Metering
* Cochrane Corp'n

Heaters and Purifiers, Feed Water (Open)
* Cochrane Corp'n
Elliott Co.
* Erie City Iron Works
Hoppes Mfg. Co.
* Springfield Boiler Co.
* Wickes Boiler Co.
* Worthington Pump & Machinery Corp'n

Heating and Ventilating Apparatus
* American Blower Co.
* American Radiator Co.
* Clarage Fan Co.
* Sturtevant, B. F. Co.

Heating Specialties
* Foster Engineering Co.
* Fulton Co.

Heating Specialties, Vacuum
* Foster Engineering Co.

Hoisting and Conveying Machinery
* Brown Hoisting Machinery Co.
Chain Belt Co.
Clyde Iron Works Sales Co.
* Gifford-Wood Co.
* Jones, W. A. Fdry. & Mach. Co.
Lidgerwood Mfg. Co.
Link-Belt Co.

Hoists, Air
* Ingersoll-Rand Co.
* Nordberg Mfg. Co
* Whiting Corp'n

Hoists, Belt
Clyde Iron Works Sales Co.
Lidgerwood Mfg. Co.

Hoists, Chain
Reading Chain & Block Corp'n
* Yale & Towne Mfg. Co.

Hoists, Electric
* Allis-Chalmers Mfg. Co.
* American Engineering Co.
* Brown Hoisting Machinery Co.
Clyde Iron Works Sales Co.
* Elwell-Parker Electric Co.
* General Electric Co.
Lidgerwood Mfg. Co.
Link-Belt Co.
* Nordberg Mfg. Co.
Reading Chain & Block Corp'n
* Yale & Towne Mfg. Co.

Hoists, Gas and Gasoline
Lidgerwood Mfg. Co.

Hoists, Head Gate
Smith, S. Morgan Co.

Hoists, Locomotive & Coach
* Whiting Corp'n

Hoists, Mine
Lidgerwood Mfg. Co.
* Nordberg Mfg. Co.

Hoists, Skip
* Brown Hoisting Machinery Co.
Lidgerwood Mfg. Co.
Link-Belt Co.

Hoists, Steam
(See Engines, Hoisting)

Holders, Tool
* Cleveland Twist Drill Co.

Hoppers, Ash
Baker Dunbar Co.

Hose, Acid
* United States Rubber Co.

Hose, Air and Gas
* Goodrich, B. F. Rubber Co.
* United States Rubber Co.

Hose, Fire
* United States Rubber Co.

Hose, Gas
* United States Rubber Co.

Hose, Gasoline
* Goodrich, B. F. Rubber Co.
* United States Rubber Co.

Hose, Metal, Flexible
Johns-Manville (Inc.)

Hose, Oil
* United States Rubber Co.

Hose, Rubber
* Goodrich, B. F. Rubber Co.
* United States Rubber Co.

Hose, Steam
* United States Rubber Co.

Hose, Suction
* United States Rubber Co.

Humidifiers
* American Blower Co.
* Carrier Engineering Corp'n
* Sturtevant, B. F. Co.

Humidity Control
* American Blower Co.
* Carrier Engineering Corp'n
* Sturtevant, B. F. Co.
* Tagliabue, C. J. Mfg. Co.

Hydrants, Fire
Kennedy Valve Mfg. Co.
Murdock Mfg. & Supply Co.
* Reading Steel Casting Co. (Inc.) (Pratt & Cady Division)
* Worthington Pump & Machinery Corp'n

Hydrants, Yard
Murdock Mfg. & Supply Co.

Hydraulic Machinery
* Allis-Chalmers Mfg. Co.
* Ingersoll-Rand Co.
Mackintosh-Hemphill Co.
* Worthington Pump & Machinery Corp'n

Hydraulic Press Control Systems (Oil Pressure)
* American Fluid Motors Co.

Hydrokineters
Bethlehem Shipbldg.Corp'n(Ltd.)
* Schutte & Koerting Co.

Hydrometers
* Tagliabue, C. J. Mfg. Co.
* Taylor Instrument Cos.

Hygrometers
* Tagliabue, C. J. Mfg. Co.
* Taylor Instrument Cos.
Weber, F. Co. (Inc.)

Ice Making Machinery
* De La Vergne Machine Co.
* Frick Co. (Inc.)
* Ingersoll-Rand Co.
Johns-Manville (Inc.)
* Nordberg Mfg. Co.
* Vilter Mfg. Co.
* Vogt, Henry Machine Co.

Ice Tools
* Gifford-Wood Co.

Idlers, Belt
Hill Clutch Machine & Fdry. Co.
* Smidth, F. L. & Co.

Indicator Posts
* Crane Co.
Kennedy Valve Mfg. Co.
* Reading Steel Casting Co. (Inc.) (Pratt & Cady Division)

Indicators, CO
* Uehling Instrument Co.

Indicators, CO_2
Bacharach Industrial Instrument Co.
* Uehling Instrument Co.

Indicators, Engine
* American Schaeffer & Budenberg Corp'n
Bacharach Industrial Instrument Co.
* Crosby Steam Gage & Valve Co.

Indicators, Sight Flow
* Bowser, S. F. & Co. (Inc.)

Indicators, SO_2
* Uehling Instrument Co.

*Catalogue data of firms marked * appear in the A.S.M.E. Condensed Catalogues of Mechanical Equipment, 1923-24 Volume*

Described, A. W. Peters. Fuels & Furnaces, vol. 2, no. 3, Mar. 1924, pp. 227–230, 2 figs. Well-insulated one-valve control furnaces effect saving of 43 per cent in gas consumption over old furnaces and secure uniform and controllable furnace atmosphere.

FURNACES, HEAT-TREATING

Gas- vs. Oil-Fired Hardening. Gas vs. Oil Firing for Hardening Plants (Gas- oder Oelfeuerung für Härteanlagen), Fr. Messinger. Wärme, vol. 11, no. 2, Jan. 11, 1924, pp. 15–16, 5 figs. Reconstruction of salt-bath hardening furnace by changing from oil to gas firing; hardening and maintenance of temperature; reduction of size of annealing chamber underneath crucible with gas firing; arrangement of burner; positive regulation of gas-air mixture; results with regard to time required for starting fire, hourly rate of fuel consumption, and quantity of heat consumed.

FURNACES, REVERBERATORY

Iron and Steel. Reverberatory Furnaces for Heating Iron and Steel, W. Mason. Metal Industry (Lond.), vol. 24, no. 8, Feb. 22, 1924, pp. 177–178, 4 figs. Chief practical details of design, control, and repair of ordinary reverberatory furnace, and principal faults in operation.

G

GAGES

Special. Special Gages (Sonderlehren), E. Schuchardt. Maschinenbau, vol. 3, no. 9, Feb. 14, 1924, pp. 240–244, 32 figs. Points out that in addition to standard gages for standard parts as accepted by German industrial Standards Committee, there are special gages for special parts; author seeks to develop standard guides for special gages adhering strictly to gage system.

GAS ANALYSIS

Orsat Apparatus. The Technical Analysis of High-Quality Gases with the Orsat Apparatus (Die technische Analyse von hochwertigen Gasen mit dem Orsatapparat), W. Stöckmann. Stahl u. Eisen, vol. 44, no. 6, Feb. 7, 1924, pp. 153–154. Describes method for joint combustion of methane and hydrogen with pure oxygen.

Thermal-Conductivity Method. Thermal Conductivity for the Analysis of Gases, P. E. Palmer and E. R. Weaver. U. S. Bur. Standards, Technologic Papers No. 249, Jan. 7, 1924, 100 pp., 40 figs. By a comparison of resistance of two electrically-heated wires surrounded, respectively, by gas for analysis and a reference gas, a determination is possible of concentration of certain constituents in a wide variety of gas mixtures of importance in industry and research. Results of an investigation with this method.

GAS ENGINES

Tests. Gas-engine Trials, N. Harwood. Mech. World, vol. 75, no. 1935, Feb. 1, 1924, p. 65, 3 figs. Describes trials undertaken with object of investigating whether clearance space in a gas engine is wholly or partly filled every suction stroke.

Vertical. Vertical Gas Engines (Les moteurs à gaz verticaux), J. Brunswick. Technique Moderne, vol. 16, no. 1, Jan. 1, 1924, pp. 7–10, 12 figs. Describes various types manufactured in different countries.

GAS PRODUCERS

Double-Grate. A New Method for Improvement of Gas Furnaces Directly Connected with Gas Producer (Ein neuer Weg zur Verbesserung der mit dem Generator in unmittelbarer Verbindung stehenden Gasfeuerungen), J. Hudler. Gas- u. Wasserfach, vol. 67, no. 2, Jan. 12, 1924, pp. 16–18, 2 figs. Describes patented double-grate producer which has a second combustion hearth directly over step grate, and points out its economic advantages.

GASES

Cylinders, Safe Handling of. Rules for the Safe Handling of Gas Cylinders. Am. Mach., vol. 60, no. 12, Mar. 20, 1924, p. 424. Rules prepared by Gas Products Assn., Chicago, for handling of cylinders containing compressed oxygen, hydrogen and acetylene.

Dust Removal. Separating Dust from Gases with Dust, Geo B. Cramp. Chem. & Met. Eng., vol. 30, no. 10, Mar. 10, 1924, pp. 400–401, 2 figs. System primarily developed by author for blast-furnace gases, but which should be effective and useful elsewhere, employs dust from gas as filtering medium for filtering out more dust.

The Elimination of Chimney Discharges by Means of Electric Gas Cleaning (Die Beseitigung des Schornstein-Auswurfs mittels elektrischer Gasreinigung), H. Schroeder. Feuerungstechnik, vol. 12, nos. 9 and 10, Feb. 1 and 15, 1924, pp. 65–66 and 73–77, 7 figs. Losses through soot, coke- and flue-dust particles, and their removal by means of flue-dust separators; describes Oski process and installation for gas cleaning and dust removal; its advantages, working costs, arrangement, and useful scope.

GEAR CUTTING

Bevel Gears. The Cutting of Bevel Gears on the Universal Milling Machine (Das Fräsen von Kegelrädern auf der Universalfräsmaschine), M. Raudnitz. Werkstattstechnik, vol. 18, no. 5, Mar. 1, 1924, pp. 135–141, 24 figs. Development of method, based on theoretical investigation of a bevel-gear tooth face, according to which bevel gears can be generated on universal milling machine with side-milling cutter, without aid of special devices, and more nearly approaching theoretically correct form.

The Cutting of Bevel Gears with Profile Cutters (Schneiden von Kegelrädern mit Formfräsern). Werkstattstechnik, vol. 18, no. 5, Mar. 1, 1924, pp. 156–158, 7 figs. Adjustment of cutter and bevel-gear rings; cutting of gear segments and of double-angle bevel gears. See also articles entitled Rough Turning of Bevel Gears (Schruppen von Kegelrädern), pp. 158–161, 11 figs.; and Cutting of Spiral Bevel Gears with Worm Hobs (Fräsen von Spiralkegelrädern mit Schneckenfräsern), pp. 161–167, 16 figs.

GEARS

Bevel. Gear Machining (Zahnräderbearbeitung), G. Olah. Werkstattstechnik, vol. 18, no. 5, Mar. 1, 1924, pp. 121–134, 44 figs. Describes different methods and machines for producing bevel gears.

Helical. The Graphical Solution of Helical Gear Problems, F. Szabo. Am. Mach., vol. 60, no. 11, Mar. 13, 1924, pp. 391–394, 11 figs. Method for investigating characteristics of helical gearing; approximate solution to problem easily obtainable; trial calculations eliminated; method adapted to all conditions.

Marine. A Basis for the Explanation of Marine Gearing Troubles, Wm. Sellar. Inst. Mar. Engrs.—Trans., vol. 35, Feb. 1924, pp. 525–570, 63 figs. It is shown that as gears become more accurately cut the more likely will twist and bending of pinion be counted as responsible for troubles that may arise, and author advises designers to look further into subject of bending and twisting of pinion.

Reversing, Tooth Position for. Calculation of Tooth Position for Spur-Wheel Reversing Gear (Berechnung der Räderstellung für Stirnräderwendegetriebe), K. Hoecken. Maschinenbau, vol. 3, no. 8, Jan. 24, 1924, pp. 197–200, 4 figs. For reversing gear with axially movable and disengageable change wheels, position of teeth when changing is calculated which is necessary to permit the engagement of teeth.

Spur. Spur-Gear Machining (Stirnräderbearbeitung), Barth. Werkstattstechnik, vol. 18, no. 4, Feb. 15, 1924, pp. 75–98, 119 figs. Describes different methods and machines for producing spur gears.

Teeth, Evolution of. Historical Notes on Gear Teeth, L. D. Burlingame. Machy. (N. Y.), vol. 30, no. 7, Mar. 1924, pp. 529–534, 10 figs. Evolution of gear teeth from crude beginnings and early equipment for cutting.

GRINDING MACHINES

Gear. A New Full-Automatic Gear Grinder. Eng. Production, vol. 7, no. 137, Feb. 1924, pp. 41–43, 6 figs. Details of involute gear grinder placed on market by Fellows Gear Shaper Co., Springfield, Vt.

H

HARDNESS

Ball Testing Method. Ball Method of Hardness Testing and Its Importance Today in the Evaluation of Metallic Materials (La prova di durezza alla sfera e la sua importanza nell'odierno collaudo dei materiali metallici), V. Prever. Ingegneria, vol. 3, no. 1, Jan. 1, 1924, pp. 16–21, 10 figs. partly on supp. plate. Deals with load employed in penetration test and its influence in Brinell number; duration of application of load; influence of diameter of ball employed; ball deformation; and relation between hardness and tensile strength. Results obtained on carbon and alloy steels at research laboratory of Fiat Company in Turin.

HEATING AND VENTILATING

Theaters. Modern Ventilating in Theater Building, M. J. Phillips. Plumbers' Trade Jl., vol. 76, no. 5, Mar. 1, 1924, pp. 406–408 and 455, 7 figs. Description of installation, at Fort Armstrong Theater, Rock Island, Ill., including system for heating in cold weather and cooling in summer months.

HEATING, HOUSE

Oil Burners. Oil Burners for Residential Property, A. C. Carruthers. Safety Eng., vol. 47, no. 2, Feb. 1924, pp. 60–64, 3 figs. Principal data on ten oil burners, for installation in various types of hot-water heaters, steam boilers, and hot-air furnaces, which have received approval of Underwriters' Laboratories. Regulations issued for their construction and use.

Vapor. Vapor Heating System For Small Dwellings, T. E. Mason. Plumbers' Trade Jl., vol. 76, no. 4, Feb. 15, 1924, pp. 330–331 and 334, 4 figs. Details of an actual installation in representative building situated in high-altitude territory.

HEATING, STEAM

Oil-Burning System. Oil Burning Equipment, M. Griffith. Plumbers' Trade Jl., vol. 76, no. 4, Feb. 15, 1924, pp. 326–329, 7 figs. Details of storage tanks, apparatus and piping installation for large office building in accordance with requirements of Nat. Board of Fire Underwriters.

Practice. Modern Steam Heating, A. J. Assheton. Domestic Eng. (Lond.), vol. 44, nos. 1 and 2, Jan. and Feb. 1924, pp. 3–10, and 33–35, 12 figs. Discusses decomposition of air impurities and purities; course of convection currents; object of air eliminator; pipe sizes; vapor, mechanical return, and vacuum systems.

HOBBING MACHINES

Spline. Sommer & Adams Rotary Spline Hobbing Machine. Machy. (N. Y.), vol. 30, no. 7, Mar. 1924, pp. 555–556, 3 figs. Describes multiple-spindle machine in which eight pieces of work are finished by as many hobs, while practically entire machine, with exception of base, revolved past operator; it is believed same principle can be applied to hobbing of gears.

HOISTS

Electric. An Electric Hoist Controlled by Compressed Air, H. V. Haight. Can. Min. Jl., vol. 45, no. 8, Feb. 22, 1924, pp. 175–180, 8 figs. Particulars of two hoists recently built for use in Porcupine camp; double-drum type, the two drums being on one shaft and intended for operating normally in balance; both drums provided with band friction clutches so that either may be operated independently; drive is through single-reduction Falk herringbone gearing; 250-hp. 550-volt 60-cycle slip-ring hoist motor; designed for maximum rope pull of 12,000 lb. and a depth of 2000 ft.

Electric Drives for Mine Hoists, L. A. Umansky. Coal Industry, vol. 7, no. 2, Feb. 1924, pp. 75–82, 13 figs. Economic comparison of various systems in use; induction-motor drive and Ward-Leonard control with flywheel motor generator set is discussed.

Large Electric Winders at the Randfontein Central Gold Mining Company, Limited, Chas. Miles and A. W. Stoker. S. African Instn. Engrs.—Jl., vol. 22, no. 6, Jan. 1924, pp. 77–93 and (discussion) 93–94, 22 figs. Details of mechanical and electrical portions; designed to hoist rock load of 10,000 lb. from depth of 3000 ft.; gear is operated by Ward-Leonard system with two main 2500-hp. motors.

HYDRAULIC ACCUMULATORS

Construction and Characteristics. Hydraulic Accumulators, H. S. Cattermole. Mech. Wld., vol. 75, no. 1938, Feb. 22, 1924, pp. 113–114. Characteristics and constructional details.

Design. Hydraulic-Accumulator Installation at the Hartmann Textile Mill at Munster (Alsace) [L'installation d'accumulation d'énergie hydraulique des Manufactures Hartmann, à Munster (Haut-Rhin)]. Génie Civil, vol. 84, no. 2, Jan. 12, 1924, pp. 29–32, 6 figs. Whole plant includes low-pressure hydroelectric station with head of 15 m., and accumulating station with its sets of Sulzer centrifugal pumps and installations for utilization of high pressure.

HYDRAULIC MACHINERY

Manufacture. Fabricating Hydroelectric Units, H. R. Simonds. Iron Trade Rev., vol. 74, no. 11, Mar. 13, 1924, pp. 732–735, 7 figs. Describes production of heavy castings and steel-plate sections for water-power machinery; new 70,000-hp. turbo-generator under construction by Allis-Chalmers Mfg. Co., Milwaukee.

HYDRAULIC TURBINES

Checking Performance. Checking the Operation of Hydro-Electric Units, Ralph Brown. Power, vol. 59, no. 10, Mar. 4, 1924, pp. 361–363, 4 figs. Detecting lost motion in operating-cylinder mechanism; checking output of unit; causes of reduced capacity; scheduling work when unit is taken out of service for repairs.

Double-Runner Horizontal. Turbines in Raanaasfoss Power Station, H. Thoresen. Power, vol. 59, no. 8, Feb. 19, 1924, pp. 278–281, 8 figs. Plan contains six double-runner horizontal-shaft 12,000-hp. turbines operating under head varying from 31 to 46 ft.; turbines are set in open flumes and two different European designs are used.

Ice Formation, Prevention. Preventing Ice Formation on Water Turbines, R. S. Hyatt. Elec. World, vol. 83, no. 8, Feb. 23, 1924, p. 386, 1 fig. Describes what is said to be effective means of heating turbine and preventing adherence of ice.

Installation System. Hallinger System of Installing Francis Turbines with Horizontal Shafts (Francisturbinen mit liegender Welle nach der Einbauweise von Hallinger), C. Reindl. Zeit. des Vereines deutscher Ingenieure, vol. 68, no. 6, Feb. 9, 1924, pp. 119–123, 14 figs. Describes four power plants and two designs for double twin turbines, which are located in machinery house under sheet-metal cover and have high-suction head-water level; arrangement requires little space, is easily installed and controlled.

HYDROELECTRIC DEVELOPMENTS

Bavaria. Water Power Developments in Bavaria. World Power, vol. 1, no. 2, Feb. 1924, pp. 80–84. Data on power developments of rivers in Bavaria; principal hydroelectric stations; distribution; financial aspect; railway electrification.

Gold and Silver Mines, Ontario. Hydro-Electric Development for Gold and Silver Mines of Northern Ontario, A. R. Webster. Ontario Dept. Mines—Bul., no. 46, 1923, 23 pp., 20 figs. Describes installations of different power companies and gives amount of turbine capacity connected to generators owned by each, aggregating 64,490 hp.

Liffey Project, Ireland. The Liffey Power Scheme, R. N. Tweedy. Elec. Rev., vol. 94, nos. 2411 and 2422, Feb. 15 and 22, 1924, pp. 244–245 and 285–287, 2 figs. Discusses scheme developed by Buchi, of Zurich, for Dublin Corp., which, it is claimed, may be accepted as basis of any scheme which involves complete control of Liffey River.

Manitoba. Great Falls Hydro-Electric Development of the Manitoba Power Company. Power, vol. 59, no. 12, Mar. 18, 1924, pp. 436–442, 12 figs. Complete project will consist of dam nearly mile long and installation of six 28,000-hp. turbines to operate under 56-ft. head, and each will require 5200 cu. ft.-sec. of water at full load; turbines are of propeller type and are largest capacity of this type ever constructed; special features are incorporated in design of draft tubes and scroll cases.

San Francisco, Cal. The Hetch Hetchy Water Supply and Power Project, C. W. Geiger. Nat. Engr., vol. 28, no. 3, Mar. 1924, pp. 95–99, 4 figs. Will supply, when completed 400,000,000 gal. water daily to population of 4,000,000 people in San Francisco and other cities of metropolitan district, and will generate 200,000 hp.; describes O'Shaughnessy dam, and gives construction details of tunnel.

Sicily. A Sicilian Hydro-Electric Installation, J.

Manufactured by Advertisers — CLASSIFIED LIST OF MECHANICAL EQUIPMENT — Alphabetical List on page 174

Indicators, Speed
* American Schaeffer & Budenberg Corp'n
Veeder Mfg. Co.

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(See Stokers)

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* Simplex Valve & Meter Co.
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Meters, Flow
Bacharach Industrial Instrument Co.
* Bailey Meter Co.
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Meters, Oil
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* Cochrane Corp'n
* General Electric Co.
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Meters, Pitot Tube
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Packing, Centrifugal Pump
Garlock Packing Co.

Packing, Hydraulic
Garlock Packing Co.
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Johns-Manville (Inc.)
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Packing, Metallic
Garlock Packing Co.
Johns-Manville (Inc.)
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Garlock Packing Co.
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Johns-Manville (Inc.)
Steel Mill Packing Co.
* United States Rubber Co.

*Catalogue data of firms marked * appear in the A.S.M.E. Condensed Catalogues of Mechanical Equipment, 1923-24 Volume*

S. Barnes. Elev. Rev., vol. 94, no. 2411, Feb. 8, 1924, pp. 219–221, 8 figs. Details of Belice hydroelectric scheme near Palermo; main storage reservoir has total capacity of 32,800,000 cu. m., of which 21,000,000 cu. m. may be drawn upon; dam is 133 ft. high, 866 ft. long and is dry-built of stone; pressure tunnel is 850 m. long; in engine room are four Pelton wheels each of 3500 b.hp. connected directly with four 3-phase alternators.

HYDROELECTRIC PLANTS

Austria. The Teigitsch Hydroelectric Plant of the Styrian Water-Power & Electricity Corp., Austria (Das Teigitschkraftwerk der Steirischen Wasserkraft- und Elektrizitäts-A.G.), W. Hahn. Elektrotechnik u. Maschinenbau, vol. 42, no. 7, Feb. 17, 1924, pp. 89–94, 6 figs. Describes most important features of development, including dam, pressure conduits, reservoir, etc.; power-house equipment; includes three Francis spiral turbines to which generators are direct coupled.

Vienna Builds Remarkable Power Project on Ybbs River, O. Lemberger. Eng. News-Rec., vol. 92, no. 12, Mar. 20, 1924, pp. 494–496, 5 figs. Collapsible weir dam; six miles of tunnels, one siphon and two aqueducts in conduit; unusual type of surge basin; penstock carried on slide bearings; electrical current is transmitted to Vienna over 110,000-volt transmission line 84 mi. long, partly simple 3-phase and partly double 3-phase on steel towers.

France. The Hydroelectric Plant of the Société Drac-Romanche at Pont-de-Claix on the Isère River (France) (L'usine hydro-électrique Drac-Romanche), P. Dufour. Génie Civil, vol. 84, no. 1, Jan. 5, 1924, pp. 1–8, 17 figs. Development includes dam, 750-m. open canal, 1450-m. reinforced-concrete pressure conduit, 14,000-hp. power plant, equipped with six sets of turbo-alternators, and 750-m. tail race; study of connection of conduit with plant.

I

ICE PLANTS

Equipment. Essentials of a Modern Ice Plant, C. T. Baker. Refrigeration, vol. 34, no. 2, Feb. 1924, pp. 43–47. What modern plant should consist of as regards machinery and equipment.

Improvements. Improvement In Ice Plants, R. C. Doremus. Universal Engr., vol. 39, no. 2, Feb. 1924, pp. 23–28. Deals with water treatment, air treatment, ice-making system, harvesting equipment, condensers, water heating, electric drive, ice storage, etc. Paper read before N. A. P. R. E.

IMPACT TESTING

Notched-Bar Tests. On Notched-Bar Impact Tests, P. Fillunger. Testing, vol. 1, no. 1, Jan. 1924, pp. 23–32, 7 figs. Refers to formula for expressing energy to produce deformation in notched-bar impact specimen, and in order to show that equation is borne out by test results, investigation is made of several notched specimens of identical material but with different eccentricities.

INDEXES

Decimal Classification. The Nature, Purpose and Aim of Decimal Classification (Die Dezimalklassifikation. Ihr Wesen, Zweck und Ziel), E. Fontanellaz. Glasers Annalen, vol. 94, no. 4, Feb. 15, 1924, pp. 44–46. Discusses DK (Dewey) classification system and its advantages for arranging and indexing technical publications.

INDUSTRIAL MANAGEMENT

Planning. Planning System in a Car Manufacturing Plant. Ry. Rev., vol. 74, no. 9, Mar. 1, 1924, pp. 357–365, 15 figs. System of scheduling car-repair work in shops of Ralston Steel Car Co., Columbus, O.; exercises complete control of all manufacturing activities.

Production Organization. Production Organization. Eng. Production, vol. 7, no. 138, Mar. 1924, pp. 74–77. Reasons for organization and methods to be adopted; the ideal organization; laws governing manufacture; procedure in organizing a new factory.

Service Methods. Service, W. L. Wise. Soc. Automotive Engrs.—Jl., vol. 14, no. 3, Mar. 1924, pp. 274–276 and 318. Applications of basic principles of service as developed by Nat. Cash Register Co., Dayton, O., are suggested for promulgation in automotive industry, following statement of methods employed in servicing cash registers.

Stockroom Methods. Extreme Variety Versus Standardization, J. H. Van Deventer. Indus. Mgt. (N. Y.), vol. 67, no. 3, Mar. 1924, pp. 129–135, 13 figs. Stockroom methods and stock handling at plant of Gen. Elec. Co. at Schenectady.

INDUSTRIAL PLANTS

Maintenance. Modern Maintenance of Plant and Equipment, Wm. G. Ziegler. Indus. Mgt. (N. Y.), vol. 67, no. 3, Mar. 1924, pp. 167–174, 9 figs. Carpentry, masonry, and machine repair.

INDUSTRIAL RELATIONS

Employees' Publications. Coöperation through Plant Publications, W. R. Winans. Iron Age, vol. 113, no. 9, Feb. 28, 1924, pp. 647–649. Basic principles to be considered in planning such publication, and outline of kind and proper handling of items that will keep it sold.

Coöperative Program, B. & O. Shops. New Cooperative Developments on the B. & O. Ry. Age, vol. 76, no. 10, Mar. 8, 1924, pp. 543–545. Program of coöperation between federated shop-craft unions and management started a year ago now extended to all shops on system; sharing gains; stabilization of employment; ideas from shopmen.

INSURANCE

Group. Group Insurance as a Factor in Industrial Relations, Wm. F. Chamberlin. Indus. Mgt. (N. Y.), vol. 67, no. 3, Mar. 1924, pp. 149–150. Plans of group life insurance which have been found to be practical; formula in use by two or three well-known concerns.

INTERCHANGEABLE MANUFACTURE

Maintaining Interchangeability. Maintaining Interchangeability. Am. Mach., vol. 60, no. 10, Mar. 6, 1924, pp. 349–350. Cases that would defeat interchangeability. (Abstract.) Address before Cleveland Eng. Soc.

INTERNAL-COMBUSTION ENGINES

Internal Losses. How Internal Losses in Power Plants Vary with Speed, P. M. Heldt. Automotive Industries, vol. 50, no. 10, Mar. 6, 1924, pp. 556–558. Determined by "motoring" engine with electric dynamometer; torque representing pumping loss is directly proportional to r.p.m. but frictional loss is independent of that factor.

Lubrication. Lubrication of Internal Combustion Engines, H. B. Warner. Ariz. Min. Jl., vol. 7, no. 18, Feb. 15, 1924, pp. 21–22. Data regarding cycle of operations of internal-combustion engines.

Temperature, Influence of Mixture on. Strength of Mixture Has Marked Effect on Engine Temperature, C. B. Dicksee. Automotive Industries, vol. 50, no. 10, Mar. 6, 1924, pp. 566–571, 7 figs. Influence not always realized sufficiently; recent researches show relationship; experiments indicate detonation is function of rate of flame propagation.

[See also AIRPLANE ENGINES; AUTOMOBILE ENGINES; DIESEL ENGINES; MOTOR TRUCKS, ENGINES; OIL ENGINES.]

IRON CASTINGS

Defective. Defective Castings: Causes and Remedies. Foundry Trade Jl., vol. 29, no. 390, Feb. 7, 1924, pp. 125–128, 10 figs. Causes and remedies of different defects; eccentric cores; venting plates and gutters; small high-speed flywheels.

IRON, PIG

Charcoal, Manufacture of. The Mysore Distillation and Iron Works Design and Construction, J. P. Carmody. Mysore Engrs.' Assn. Bul., vol. 1, no. 1, July-Sept. 1923, pp. 23–72. Description of works located at Bhadravati on Bhadra river, British India, including saw-mill, carbonizing, distillation, ore-crushing, and blast-furnace plants, power house and electrical equipment, and boiler house. Crude methyl alcohol, acetate of lime, tar and light oils are recovered from pyroligneous acid.

L

LATHES

Turret, Use for Chucking Work. The Ungeared Capstan Lathe as a Chucking Machine, E. W. Field. British Machine Tool Eng., vol. 3, no. 25, Jan.-Feb. 1924, pp. 3–7 and 28, 9 figs. Gives examples showing large range of chucking work small plain-head turret lathe will cover.

Turret vs. Lathe Work. Lathe and Turret Work Compared, J. Horner. Mech. World, vol. 75, nos. 1932 and 1937, Jan. 11 and Feb. 15, 1924, pp. 18–19 and 94, 10 figs. Describes procedure.

LIQUIDS

Fluidity and Temperature, Relation of. A Relation between the Fluidity and the Temperature of Liquids, H. J. M. Creighton. Nova Scotian Inst. Sci.—Proc. & Trans., vol. 15, Pt. 3–4, Nov. 1923, pp. 165–168. Calculations.

LOCOMOTIVE BOILERS

Dome Flanging. Flanging Locomotive Boiler Domes in One Piece. Boiler Maker, vol. 24, no. 2, Feb. 1924, pp. 31–36, 4 figs. Practice of Am. Locomotive Co., Schenectady, N. Y.; flanging throat sheets.

Performance. Locomotive Boiler Performance, E. C. Poultney. Engineer, vol. 137, nos. 3556 and 3557, Feb. 22 and 29, 1924, pp. 192–195 and 218–221, 15 figs. Information on performance of locomotive boilers differing in proportion of their related parts when operating at various rates of power output, based upon tests made by Pennsylvania System on locomotive testing plant at Altoona, Pa.

LOCOMOTIVES

Adhesion and Rack. A Modern Rack Locomotive. Ry. Gaz., vol. 40, no. 6, Feb. 8, 1924, p. 174, 1 fig. Principal data of recent type of 4-cylinder, 2-8-2 type combined rack and adhesion locomotive, built for German State Rys. for operation on Abt system.

British. British Locomotives in 1923, J. F. Gairns. Int. Ry. Congress Assn.—Bull., vol. 6, no. 2, Feb. 1924, pp. 121–137, 8 figs. Designs and work.

Compound vs. Simple. Compound vs. Simple Locomotives in France, M. Vallantine. Ry. Age, vol. 76, no. 8, Feb. 23, 1924, pp. 461–462. Tests of Pacific locomotives in express service on P. L. & M. and Paris-Orleans show economy of compounds.

Decapod. Decapod Type Locomotive for G. M. & N. R. R. Ry. Rev., vol. 74, no. 8, Feb. 23, 1924, pp. 317–320, 4 figs. Dimensions and principal data of 2-10-0, type locomotives of Gulf Mobile & Northern R. R. for heavy freight service; 215-lb. boiler pressure; 60,000-lb. tractive force. See also Ry. & Locomotive Eng., vol. 37, no. 2, Feb. 1924, pp. 35–36, 1 fig.; and Railroad Herald, vol. 28, no. 3, Feb. 1924, pp. 16–17, 1 fig.

Design. Locomotive Design. Ry. Jl., vol. 30, no. 3, Mar. 1924, pp. 18–19, 45 figs. pp. 19–31. Deals with starting capacity, hauling capacity and general economy in operation. Illustrations of American locomotive types.

The Locomotive of To-Day, J. Partington. New England Railroad Club, Feb. 12, 1924, pp. 245–257 and (discussion) 257–273. Discusses ways in which design must be definitely made to fit physical limitations of roadbed, bridges, tunnels, roundhouses, etc., and important connection between design and maintenance facilities especially as it applies to proper maintenance of appliances and materials now coming into general use. Review of three-cylinder locomotive; description of 3-cylinder locomotive No. 5000 of Lehigh Valley R. R. and results of test made in Dec. 1923.

Diesel-Compressed Air. Diesel-Compressed Air Locomotive. Times Trade & Eng. Supp., vol. 13, no. 295, Mar. 1, 1924, p. 615. Invention consists in applying compressed air by means of Diesel engine as motive power for railway traction; results of trials on Italian railways.

Evolution. Railway Developments and the Evolution of High-Speed Locomotives (Le développement des chemins de fer et l'évolution de la locomotive à grande vitesse), M. Demoulin. Génie Civil, vol. 84, nos. 3 and 4, Jan. 19 and 26, 1924, pp. 60–64 and 85–89, 14 figs. Describes engine types built between years of 1850 and 1865, showing that many reputedly modern innovations are merely re-inventions, success of which was due to certain improvements in details or other factors.

4-8-2 Type. Southern Pacific 4-8-2 Type Locomotives. Ry. Mech. Engr., vol. 98, no. 3, Mar. 1924, pp. 141–146, 10 figs. Description of locomotives designed to haul trains of 12 passenger cars on 2 per cent grades and run 815 miles (between Los Angeles, Cal., and El Paso, Tex.); rated tractive force, 85 per cent, 57,510 lb., and with booster, 67,660 lb.

Fuel Economy. Suggestions on Locomotive Fuel Economy, D. L. Franciscus. Ry. Rev., vol. 74, no. 7, Feb. 16, 1924, pp. 286–288. Abstract of prize-winning paper in Int. Ry. Fuel Assn. contest.

Garratt Type. Garratt Locomotive in India and South Africa. Ry. Rev., vol. 74, no. 10, Mar. 8, 1924, pp. 447–449, 3 figs. Describes locomotives to be placed in service on Burma and New Cape Central railways, former having 2–8–0—0–8–2 wheel arrangement, and latter 2–6–2—2–6–2 arrangement.

Lubrication. Force Feed Lubrication on Locomotives, A. H. Woodward. Ry. Mech. Engr., vol. 93, no. 3, Mar. 1924, pp. 151–152, 4 figs. Describes an original method by which oil is automatically supplied to the various bearing surfaces.

Mikado. Mikado Type Locomotives, Canadian National Railways. Can. Ry. & Mar. World, no. 312, Feb. 1924, pp. 53–55, 4 figs. Belspaire boiler; 27 by 30-in. cylinder; working pressure 185 lb.; maximum tractive power 54,600 lb. See also Boiler Maker, vol. 24, no. 2, Feb. 1924, pp. 45–47, 2 figs.

Two Light Mikado Locomotives Built at Lima. Ry. Age, vol. 76, no. 9, Mar. 1, 1924, pp. 505–506, 2 figs. Designed for local conditions but approximately same capacity as U. S. R. A. light Mikados.

Mountain Type. Lehigh Valley Three-Cylinder Locomotive Tests. Ry. Age, vol. 76, no. 15, Mar. 15, 1924, pp. 755–757, 13 figs. 4–8–2 type built by Am. Locomotive Co. handles heavy tonnage with low fuel consumption; results of tests; performance on grades.

Rebuilt. Modernized Power From Reconstructed Locomotives. Ry. Rev., vol. 75, no. 9, Mar. 1, 1924, pp. 367–372, 9 figs. Account of overhauling of several classes of engines by Chicago Indianapolis & Louisville Ry. in its shops at La Fayette, Ind. illustrating methods by which Monon has practically made modern locomotives out of old, as engines pass through shops for repairs.

Steam-Turbine. Turbo-Condensing Locomotives (Dampflokomotiven mit Kondensation). Glasers Annalen, vol. 94, no. 3, Feb. 1, 1924, pp. 25–31, 4 figs. Discussion by R. P. Wagner and others of paper by R. Lorenz, in which former claims that use of steam condensation in piston locomotives effects little or no improvement with regard to performance or economy.

10-Wheel. Maine Central Purchases Ten-Wheel Locomotives. Ry. Age, vol. 76, no. 10, Mar. 8, 1924, pp. 555–556, 1 fig. Modern design of medium capacity with 63-in. drivers suitable for local passenger or freight traffic.

Three-Cylinder. Three Cylinder Superheated Steam Express Locomotive of the German State Railways. Ry. & Locomotive Eng., vol. 37, no. 3, Mar. 1924, pp. 75–78, 3 figs. German argument against use of two-cylinder compound locomotive; describes type of three-cylinder locomotive first built at Borsig shops in Tegel in 1922 and now being used somewhat extensively on German railways.

2-8-2. New 3-Cylinder, 2-8-2 Type Locomotive, German State Railways. Ry. Gaz., vol. 40, no. 5, Feb. 1, 1924, p. 143, 1 fig. Principal dimensions and data of locomotives designed for working express passenger and heavy freight traffic; working pressure 200 lb. per sq. in.

New 2-8-2 Type Locomotives for the Sudan Government Railways. Ry. Gaz., vol. 40, no. 6, Feb. 8, 1924, p. 173, 1 fig. Principal data of locomotives being introduced for working on Kassala line extension; for 3-ft. 6-in. gage; tractive force at 85-per cent boiler pressure, 26,000 lb.

2-10-2. 2-10-2 Type Replace Mallets on Great Northern. Ry. Age, vol. 76, no. 8, Feb. 23, 1924, pp. 459–460, 1 fig. 3000 tons handled over 1.8-per cent grade by locomotives of 87,130-lb. tractive force; built by Baldwin Locomotive Works.

Types. Some Recent Notable Locomotives, J. Partington. Can. Ry. Club—Proc., vol. 23, no. 1, Jan. 1924, pp. 21–32 and (discussion) 32–39, 2 figs.

Manufactured by Advertisers — CLASSIFIED LIST OF MECHANICAL EQUIPMENT — Alphabetical List on page 174

Packing, Rubber
Garlock Packing Co.
* Goodrich, B. F. Rubber Co.
* Jenkins Bros.
Johns-Manville (Inc.)
* United States Rubber Co.

Packing, Sheet
Garlock Packing Co.
* Goodrich, B. F. Rubber Co.
* Jenkins Bros.
Johns-Manville (Inc.)
Steel Mill Packing Co.
* United States Rubber Co.

Paints, Concrete (For Industrial Purposes)
Smooth-On Mfg. Co.

Paint, Metal
* Dixon, Joseph Crucible Co.
* General Electric Co.
Johns-Manville (Inc.)

Panel Boards
* Westinghouse Elect. & Mfg. Co.

Paper, Drawing
Dietzgen, Eugene Co.
Keuffel & Esser Co.
New York Blue Print Paper Co.
ParVell Laboratories
U. S. Blue Co.
Weber, F. Co. (Inc.)

Paper, Sensitized
Dietzgen, Eugene Co.
Keuffel & Esser Co.
New York Blue Print Paper Co.
ParVell Laboratories
U. S. Blue Co.
Weber, F. Co. (Inc.)

Paper Mill Machinery
Farrel Foundry & Machine Co.

Paraffine Wax Plant Equipment
Bethlehem Shipbldg.Corp'n(Ltd.)
* Vogt, Henry Machine Co.

Pasteurizers
* Vilter Mfg. Co.

Pattern Work
* American [illegible]chine & Foundry Co.
DuPont Engineering Co.

Pencils, Drawing
American Lead Pencil Co.
Dietzgen, Eugene Co.
* Dixon, Joseph Crucible Co.
Keuffel & Esser Co.
New York Blue Print Co.
ParVell Laboratories
U. S. Blue Co.
Weber, F. Co. (Inc.)

Penstocks
Smith, S. Morgan Co.

Pile Drivers
Clyde Iron Works Sales Co.
Lidgerwood Mfg. Co.

Pinions, Rolling Mill
Mackintosh-Hemphill Co.

Pinions, Steel
* General Electric Co.

Pipe, Brass and Copper
* Wheeler Condenser & Engrg. Co.

Pipe, Cast Iron
* Builders Iron Foundry
* Central Foundry Co.
* U. S. Cast Iron Pipe & Fdry. Co.

Pipe, Riveted
* American Spiral Pipe Wks.
* Springfield Boiler Co.
Steere Engineering Co.
* Titusville Iron Works Co.
* Walsh & Weidner Boiler Co.

Pipe, Soil
* Central Foundry Co.

Pipe, Steel
* Crane Co.
Steere Engineering Co.

Pipe, Welded
* American Spiral Pipe Wks.
* Crane Co.
* Pittsburgh Valve, Fdry. & Const. Co.
Steere Engineering Co.

Pipe, Wrought Iron
Byers, A. M. Company
* Crane Co.

Pipe Coils, Covering, Fittings, etc.
(See Coils, Covering, Fittings, etc., Pipe)

Pipe Cutting and Threading Machines
* Crane Co.
* Landis Machine Co. (Inc.)

Pipe Threading Machines
Treadwell Engineering Co.

Piping, Ammonia
* Frick Co. (Inc.)

Piping, Power
* Crane Co.
* Pittsburgh Valve, Fdry. & Const. Co.
Steere Engineering Co.
* Vogt, Henry Machine Co.

Piston Turning Machines
* National Acme Co.

Pitot Tubes
(See Tubes, Pitot)

Planimeters
* American Schaeffer & Budenberg Corp'n
* Bristol Co.
* Crosby Steam Gage & Valve Co.
Dietzgen, Eugene Co.
Keuffel & Esser Co.
New York Blue Print Co.
ParVell Laboratories
U. S. Blue Co.
Weber, F. Co. (Inc.)

Plate Metal Work
(See Steel Plate Construction)

Pointers, Bolt
* Landis Machine Co. (Inc.)

Polishing Machinery
* Builders Iron Foundry
* Royersford Fdry. & Mach. Co.

Powdered Fuel Equipment (for Boiler and Metallurgical Furnaces)
* Allis-Chalmers Mfg. Co.
* Combustion Engineering Corp'n
Grindle Fuel Equipment Co.
Holbeck Engrg. Co.
* Quigley Furnace Specialties Co.
* Smidth, F. L. & Co.
* Worthington Pump & Machinery Corp'n

Power Transmission Machinery
* Allis-Chalmers Mfg. Co.
* Brown, A. & F. Co.
Chain Belt Co.
* Diamond Chain & Mfg. Co.
* Falls Clutch & Machinery Co.
Farrel Foundry & Machine Co.
* Franklin Machine Co.
* General Electric Co.
Hill Clutch Machine & Fdry. Co.
* Hyatt Roller Bearing Co.
* Jones, W. A. Fdry. & Mach Co.
Link-Belt Co.
* Medart Co.
* Morse Chain Co.
* Royersford Fdry. & Mach. Co.
* Smidth, F. L. & Co.
Smith, S. Morgan Co.
* Woods, T. B. Sons Co.

Presses, Baling
* Franklin Machine Co.

Presses, Draw
* Niagara Machine & Tool Works

Presses, Extruding
Farrel Foundry & Machine Co.

Presses, Foot
* Royersford Fdry. & Mach. Co.

Presses, Forming
Farrel Foundry & Machine Co.

Presses, Hydraulic
* Falls Clutch & Machinery Co.
Farrel Foundry & Machine Co.
Mackintosh-Hemphill Co.

Presses, Punching and Trimming
Long & Allstatter Co.
* Niagara Machine & Tool Works
* Royersford Fdry. & Mach. Co.

Presses, Sheet Metal Working
* Niagara Machine & Tool Works

Presses, Toggle
* Niagara Machine & Tool Works

Presses, Wax
* Vogt, Henry Machine Co.

Pressure Gages, Regulators, etc.
(See Gages, Regulators, etc., Pressure)

Producers, Gas
* De La Vergne Machine Co.
* Westinghouse Electric & Mfg. Co.
* Worthington Pump & Mchry. Corp'n

Projectors, Flood Lighting
* Westinghouse Elect. & Mfg. Co.

Propellers
* Morris Machine Works

Pulleys, Friction Clutch
* Allis-Chalmers Mfg. Co.
* Brown, A. & F. Co.
* Falls Clutch & Machinery Co
Hill Clutch Machine & Fdry. Co.
Johnson, Carlyle Machine Co
* Jones, W. A. Fdry. & Mach. Co.
Link-Belt Co.
* Medart Co.
* Wood's, T. B. Sons Co.

Pulleys, Iron
* Brown, A. & F. Co.
Chain Belt Co.
* Falls Clutch & Machinery Co.
* Gifford-Wood Co.
Hill Clutch Machine & Fdry. Co.
* Jones, W. A. Fdry. & Mach. Co.
Link-Belt Co.
* Medart Co.
* Wood's, T. B. Sons Co.

Pulleys, Paper
Rockwood Mfg. Co.

Pulleys, Steel
* Medart Co.

Pulleys, Wood
* Medart Co.

Pulling Tables (For Annealing Furnaces)
* Kenworthy, Chas. F. (Inc.)

Pulverizers
* Brown, A. & F. Co.
* Smidth, F. L. & Co.

Pulverizers, Cement Materials
Pennsylvania Crusher Co.

Pulverizers, Coal
Grindle Fuel Equipment Co.
Pennsylvania Crusher Co.

Pulverizers, Limestone
Pennsylvania Crusher Co.

Pump Governors, Valves, etc.
(See Governors, Valves, etc. Pump)

Pumping Engines
(See Engines, Pumping)

Pumping Systems, Air Lift
* Ingersoll-Rand Co.

Pumps, Acid
Buffalo Steam Pump Co.
* Ingersoll-Rand Co.
* Nordberg Mfg. Co.
Taber Pump Co.
* Titusville Iron Works Co.

Pumps, Air
* Goulds Mfg. Co.
* Ingersoll-Rand Co.
* Westinghouse Electric & Mfg. Co.
* Wheeler, C. H. Mfg. Co.

Pumps, Ammonia
Buffalo Steam Pump Co.
* Goulds Mfg. Co.
* Ingersoll-Rand Co.
* Vogt, Henry Machine Co.
* Worthington Pump & Machinery Corp'n

Pumps, Boiler Feed
* Allis-Chalmers Mfg. Co.
Bethlehem Shipbldg.Corp'n (Ltd.)
Buffalo Steam Pump Co.
* Coppus Engineering Corp'n
* De Laval Steam Turbine Co.
* Goulds Mfg. Co.
* Ingersoll-Rand Co.
* Kerr Turbine Co.
* Wheeler, C. H. Mfg. Co.
* Worthington Pump & Machinery Corp'n

Pumps, Centrifugal
* Allis-Chalmers Mfg. Co.
Bethlehem Shipbldg.Corp'n (Ltd.)
Buffalo Steam Pump Co.
* Cramp, Wm. & Sons Ship & Engine Bldg. Co.
* De Laval Steam Turbine Co.
* Goulds Mfg. Co.
* Ingersoll-Rand Co.
* Kerr Turbine Co.
Lammert & Mann Co.
* Morris Machine Works
* Nordberg Mfg. Co.
Taber Pump Co.
* Westinghouse Electric & Mfg. Co.
* Wheeler, C. H. Mfg. Co.
* Wheeler Cond. & Engrg. Co.
* Worthington Pump & Machinery Corp'n

Pumps, Condensation
Buffalo Steam Pump Co.
* Ingersoll-Rand Co.
* Wheeler, C. H. Mfg. Co.

Pumps, Deep Well
* Allis-Chalmers Mfg. Co.
* Goulds Mfg. Co.
* Ingersoll-Rand Co.
* Morris Machine Works
* Worthington Pump & Machinery Corp'n

Pumps, Dredging
* Ingersoll-Rand Co.
* Morris Machine Works
* Worthington Pump & Machinery Corp'n

Pumps, Electric
* Allis-Chalmers Mfg. Co.
Buffalo Steam Pump Co.
* Goulds Mfg. Co.
* Ingersoll-Rand Co.
* Morris Machine Works
* Nordberg Mfg. Co.
Taber Pump Co.
* Worthington Pump & Machinery Corp'n

Pumps, Elevator
Buffalo Steam Pump Co.
* Goulds Mfg. Co.
* Worthington Pump & Machinery Corp'n

Pumps, Filter Press
Buffalo Steam Pump Co.
* Goulds Mfg. Co.

Pumps, Hand
* Goulds Mfg. Co.
Taber Pump Co.

Pumps, Hydraulic
* American Fluid Motors Co.
Farrel Foundry & Machine Co.

Pumps, Hydraulic Pressure
Bethlehem Shipbldg.Corp'n (Ltd.)
Buffalo Steam Pump Co.
* Goulds Mfg. Co.
* Ingersoll-Rand Co.
* Morris Machine Works
* Worthington Pump & Machinery Corp'n

Pumps, Measuring
Wayne Tank & Pump Co.

Pumps, Measuring (Gasoline or Oil)
* Bowser, S. F. & Co. (Inc.)

Pumps, Oil
Bethlehem Shipbldg.Corp'n (Ltd.)
* Bowser, S. F. & Co. (Inc.)
Buffalo Steam Pump Co.
* Goulds Mfg. Co.
* Ingersoll-Rand Co.
Lunkenheimer Co.
Nugent, Wm. W. & Co. (Inc.)
Taber Pump Co.
* Worthington Pump & Machinery Corp'n

Pumps, Oil, Force-Feed
Bethlehem Shipbldg.Corp'n(Ltd.)
* Bowser, S. F. & Co. (Inc.)
* Goulds Mfg. Co.
Lunkenheimer Co.

Pumps, Oil (Hand)
* Bowser, S. F. & Co. (Inc.)
* Goulds Mfg. Co.
Lunkenheimer Co.
Nugent, Wm. W. & Co. (Inc.)

Pumps, Power
* Allis-Chalmers Mfg. Co.
Bethlehem Shipbldg.Corp'n(Ltd.)
Buffalo Steam Pump Co.
* Goulds Mfg. Co.
* Ingersoll-Rand Co.
* Nordberg Mfg. Co.
* Wheeler Cond. & Engrg. Co.
* Worthington Pump & Machinery Corp'n

Pumps, Rotary
* Goulds Mfg. Co.
Lammert & Mann Co.
Taber Pump Co.

Pumps, Steam
* Allis-Chalmers Mfg. Co.
Buffalo Steam Pump Co.
* Ingersoll-Rand Co.
* Nordberg Mfg. Co.
* Wheeler, C. H. Mfg. Co.
* Wheeler Cond. & Engrg. Co.
* Worthington Pump & Machinery Corp'n

Pumps, Sugar House
* Allis-Chalmers Mfg. Co.
Buffalo Steam Pump Co.
* Goulds Mfg. Co.
* Ingersoll-Rand Co.
* Worthington Pump & Machinery Corp'n

Pumps, Sump
Buffalo Steam Pump Co.
* Goulds Mfg. Co.
* Ingersoll-Rand Co.
* Morris Machine Works
* Smidth, F. L. & Co.
Taber Pump Co.

Pumps, Tank
Buffalo Steam Pump Co.
* Goulds Mfg. Co.
* Ingersoll-Rand Co.
Taber Pump Co.
* Wheeler, C. H. Mfg. Co.
* Wheeler Cond. & Engrg. Co.
* Worthington Pump & Machinery Corp'n

Pumps, Turbine
* Allis-Chalmers Mfg. Co.
Buffalo Steam Pump Co.
* De Laval Steam Turbine Co.
* General Electric Co.
* Goulds Mfg. Co.
* Ingersoll-Rand Co.
* Kerr Turbine Co.
* Morris Machine Works
* Westinghouse Electric & Mfg. Co.
* Worthington Pump & Machinery Corp'n

Pumps, Vacuum
Buffalo Steam Pump Co.
* Croll-Reynolds Engrg. Co. (Inc.)
* Goulds Mfg. Co.
* Ingersoll-Rand Co.
Lammert & Mann Co.
* Nordberg Mfg. Co.
* Wheeler, C. H. Mfg. Co.
* Wheeler Cond. & Engrg. Co.
* Worthington Pump & Machinery Corp'n

*Catalogue data of firms marked * appear in the A.S.M.E. Condensed Catalogues of Mechanical Equipment, 1923-24 Volume*

Characteristics and performances of several recent designs of locomotive. See also Ry. & Locomotive Eng., vol. 37, no. 2, Feb. 1924, pp. 39–41, 1 fig.

LUBRICATING OILS

Investigating Method. A Novel, Simple and Universal Method for the Investigation of Lubricating Oils and Bearing Alloys, R. von Dallwitz-Wegner. Testing, vol. 1, no. 1, Jan. 1924, pp. 58–71, 8 figs. New method is said to be free from all factors of uncertainty.

Reclaiming Process. A New Oil Reclaiming Process. Eng. Production, vol. 7, no. 138, Mar. 1924, p. 88, 2 figs. Describes method invented by T. D. Richards, an Australian; deals with all classes and grades of dirty lubricating oils. See also Elec. Times, vol. 65, no. 1689, Feb. 28, 1924, p. 251, 1 fig.

Viscosity. Variation of Viscosity of Lubricating Oils with Temperature (Zur Temperaturabhängigkeit der Viscosität), F. König. Zeit. für angewandte Chemie, vol. 37, no. 1, Jan. 3, 1924, pp. 8–10, 1 fig. Discusses equation given by Vogel in previous issue of same journal as expressing variation of viscosity with temperature and reaches conclusion that constants employed in it cannot be determined with sufficient accuracy to render them of any value as criteria in judging commercial oils; explains how these difficulties can be overcome.

LUBRICATION

Lubricators. Methods of Applying Lubricating Oils (Méthodes d'application des lubrifiants liquides), J. Lévy. Technique Moderne, vol. 16, no. 3, Feb. 1, 1924, pp. 69–75, 14 figs. General principles and modern apparatus; describes different types of lubricators, including manual, semi-automatic, automatic and mechanical; accessory and special devices.

LUMBER

Standardization. Engineering and Industrial Standardization. Mech. Eng., vol. 46, no. 3, Mar. 1924, pp. 167–169. Simplified practice recommendations on lumber.

M

MACHINE DESIGN

Self-Centering Devices. Self-Centering Devices, A. Perham. Machy. (Lond.), vol. 23, no. 593, Feb. 7, 1924, pp. 625–627, 1 fig. Term self-centering is used to describe devices in which displacement, and recovery can be effected in each direction of movement; describes some of more usual and elementary forms of self-centering mechanism, and useful forms that are less generally known.

MACHINE SHOPS

Steel-Frame One-Story. Details of a Modern Steel Frame One-Story Shop. Eng. News-Rec., vol. 92, no. 11, Mar. 13, 1924, pp. 456–459, 7 figs. New plant of Sullivan Machy. Co., Michigan City, Ind., has specially fitted sawtooth roof and crane runways carried by main columns and jack columns; transfer table economizes yard space.

MACHINE-TOOL INDUSTRY

Great Britain. Survey of British Machine Tool Industry, Johnstone-Taylor. Iron Age, vol. 113, no. 11, Mar. 13, 1924, pp. 799–800. Builders concentrate on either light or heavy tools; changes in last ten years; surplus of automatics; status of other tools.

MACHINE TOOLS

Electrically Driven. Reglo Machine Tools (Reglo-Werkzeugmaschinen), O. Pollak. Werkstattstechnik, vol. 18, nos. 2 and 3, Jan. 15 and Feb. 1, 1924, pp. 21–28 and 53–57, 27 figs. Describes electric machine-tool drives of German Gen. Elec. Co. which form integral but interchangeable part of machine, so that such a machine works as whole unit in same way as turbo-generator, electric winding engine, etc.; numerous examples are described and illustrated.

German. New Machines and Tools Exhibited at the Leipzig Fair (Neue Maschinen und Werkzeuge). Werkstattstechnik, vol. 18, nos. 4 and 5, Feb. 15 and Mar. 1, 1924, pp. 98–110 and 141–156, 104 figs. Feb. 15: Describes method of accurate production of dividing wheels for gear-cutting machines; gear-cutting machines; automatic and turret lathes; saws; microscope for workshop measurements; etc. Mar. 1: Device for cutting bevel gears; Lauf-Thoma gears for machine tools; grinding machines; shaping and slotting machines; milling machines; woodworking machines; etc.

Speeds and Feeds. Tool Engineering, A. A. Dowd and F. W. Curtis. Am. Mach., vol. 60, no. 9, Feb. 28, 1924, pp. 315–318. Speeds and feeds of machine tools; definition of cutting speed; relation between speed and feed; points in design affected by speeds and feeds.

Standard Data Sheets. Standard Data Sheets for Machine Tool Builders and Users, A. L. Evans. Am. Mach., vol. 60, no. 11, Mar. 13, 1924, pp. 381–386, 3 figs. Standard data sheets devised by author in order to simplify work of planning, routing, designing, equipping tools, making time studies, changing factory layout and similar tasks.

MALLEABLE IRON

Iron-Carbon Eutectoid. Identification of the Thermal Effect of the Iron-Carbon Eutectoid and Extrapolation of the Heating and Cooling Curve Values to Zero Rates, A. Hayes, H. E. Flanders and E. E. Moore. Am. Soc. Steel Treating—Trans., vol. 5, no. 2, Feb. 1924, pp. 183–194, 6 figs. Application of thermal-analysis methods have been applied to location of iron-carbon eutectoid in malleable iron containing 0.95-per cent silicon; method places this point on iron-carbon diagram at temperature of 771 deg. cent.

MANOMETERS

High Pressures, Measurement of. Measurement of High Pressures, F. H. Newman. World Power, vol. 1, no. 2, Feb. 1924, pp. 85–90, 7 figs. Compressed-gas type of manometer; elastic-membrane type of gage; optical lever and piezoelectrical manometer.

MATERIALS HANDLING

Accidents. A Study of Fatal Accidents in Material Handling, D. S. Beyer. Nat. Safety News, vol. 9, no. 3, Mar. 1924, pp. 27–28. Statistical data; and particulars of 16 fatal accidents reported to Liberty Mutual Insurance Co., Boston, Mass. Paper read before joint mtg. of Eng. Section of Nat. Safety Council and Am. Soc. Safety Engrs.

Equipment for. Trends in Handling Materials, F. E. Gooding. Indus. Engr., vol. 82, no. 2, Feb. 1924, pp. 81–89, 12 figs. Reviews present tendencies and practices in industrial plants in handling material by conveyors, industrial trucks, tractors, hoists, and similar equipment.

MEASURING INSTRUMENTS

Optical. New Optical Measuring Methods for Tool and Machine Construction (Neue optische Messverfahren für den Werkzeug- und Maschinenbau), A. Steinle. Maschinenbau, vol. 3, no. 9, Feb. 14, 1924, pp. 244–249, 15 figs. New measuring instruments and favorable results obtained with them.

METALS

Brittleness. Brittleness, W. R. Barclay. Metal Industry (Lond.), vol. 24, no. 7, Feb. 15, 1924, pp. 151–162 and 168. Causes and types of brittleness; its relation to toughness, ductility, plasticity, and crystal structure. Paper read before Birmingham Met. Soc.

Coefficients of Expansion. Determination of the Thermal Coefficients of Expansion of Some Commercial Metals and Alloys, J. N. Friend and R. H. Vallance. Inst. Metals—advance paper, no. 5, for meeting Mar. 12–13, 1924, 4 pp. Describes apparatus used and results obtained.

Fatigue. The Investigation of a Fatigue Failure of Brass Tubes in a Feed-Water Heater, with a Consideration of the Nature of "Fatigue," W. E. W. Millington and F. C. Thompson. Inst. Metals—advance paper, no. 11, for meeting Mar. 12–13, 1924, 23 pp., 18 figs. Description of failure; effects of mechanical deformation on close-packed cubic crystal compares new theory of authors—that straight markings are cause of embrittlement which lead to fracture—with actually observed facts.

MILLING

Brakes, Drums and Spiders. Machining Sheldon Brakes, Drums and Spiders, F. H. Colvin. Am. Mach., vol. 60, no. 11, Mar. 13, 1924, pp. 387–389, 9 figs. Special fixtures and tools devised for machining work of odd shape; fixtures are shown in considerable detail so their construction can be more readily understood.

Grooves. The Milling of Grooves (Das Fräsen von Nuten). Praktischer Maschinen-Konstrukteur, vol. 57, no. 5, Feb. 5, 1924, pp. 39–42, 4 figs. Describes different methods, tools and machines employed, and shows how running time of a Loeve milling machine can be calculated with aid of alignment charts.

MOLDING MACHINES

Development. The Molding Machine, R. E. Search. Metal Industry (N. Y.), vol. 22, no. 2, Feb. 1924, pp. 56–58, 9 figs. Early history and development. Simple forms of foundry machines.

MOTOR BUSES

Gear-Shifting Mechanism. Novel Gear Shifting Mechanism Chief Feature of German Bus, B. R. Dierfeld. Automotive Industries, vol. 50, no. 10, Mar. 6, 1924, pp. 575–576, 5 figs. New Kastner gate change incorporates original design; special method used for locking shifter bars has merit of compactness and simplicity; device evolved to prevent swaying of rear end; front-axle steering pivot operates constantly in bath of oil; chassis is brought out by Mannesmann-Mulag Co., Aix-la-Chapelle.

Reo. Six-Cylinder Engine and Four-Wheel Brakes Feature New Reo Bus. Automotive Industries, vol 50, no. 9, Feb. 28, 1924, pp. 499–501, 4 figs. Power unit and gearset mounted in sub-frame in similar fashion to passenger car of same make; body seats 21.

Self-Charging. Self-Charging Principle Applied on 25-Passenger Bus. Bus Transportation, vol. 3, no. 3, Mar. 1924, pp. 109–112, 7 figs. Details of new bus in operation on 96th St. line, New York City; storage battery acts as a power reservoir; keeps engine-generator set working at constant output; combination permits use of a 20-hp. gasoline engine.

Specifications. American Gasoline Motor Bus Specifications. Automotive Industries, vol. 50, no. 8, Feb. 21, 1924, pp. 420–421. Table of statistics.

MOTOR-TRUCK TRANSPORTATION

Coördination of Railroad and. The Coördination of Railroad and Motor-Truck Transportation, Rob. C. Wright. Soc. Automotive Engrs.—Jl., vol. 14, no. 3, Mar. 1924, pp. 302–304. As result of study, Pa. R. R. system has become convinced that motor truck can coöperate with steam railroad in three lines of activity: (1) in substituting motor trucks for rail transportation for handling short-haul less-than-carload traffic (2) in motorizing terminals and (3) in door-to-door delivery service; advantages of motor truck in handling short-haul less-than-carload traffic; conclusions drawn.

MOTOR TRUCKS

Auxiliaries. Trucks, Truck Bodies, and Transportation, M. W. Potts. Indus. Mgt. (N. Y.), vol. 67, no. 3, Mar. 1924, pp. 151–160, 12 figs. Auxiliaries that make motor truck important link in national transportation system of United States.

Engines. A Solid Fuel Engine. Motor Transport (Lond.), vol. 38, no. 991, Feb. 25, 1924, pp. 219–220, 5 figs. Engine based on principle of injection of compressed air into solid fuel dust when in a glowing state, invented by A. Schnuerle; application to 4- and 2-cycle principle; applicable for truck or tractor work.

Glasgow Show. The Scottish Show Reviewed. Motor Transportation (Lond.), vol. 38, no. 988, Feb. 4, 1924, pp. 137–140, 17 figs. Notes on representative display of British and imported heavy vehicles, including light vans.

One-Truck. England's Largest Car Manufacturer Introduces One-Ton Truck. Automotive Industries, vol. 50, no. 9, Feb. 28, 1924, pp. 522–523, 1 fig. First British product in this class is expected to cut into practical monopoly of Ford; 3-by-4-in. engine and 122-in. wheelbase; constructed by Morris Motors, Ltd.

Producer-Gas-Driven. The New Renault Producer, W. F. Bradley. Motor Transport (Lond.), vol. 38, no. 988, Feb. 4, 1924, pp. 127–129, 8 figs. Designed to run on wood or charcoal; claimed to show cost economy of 80 per cent; comprises fire box, aspiration chamber and fuel tank, and is a cylindrical chamber 4 ft. 6 in. in height, with a diameter of 2 ft., bolted to left-hand frame member by side of driver's cab.

Saurer. Saurer 6½-Tonner Placed on American Market. Motor Transport (N. Y.), vol. 29, no. 11, Jan. 1, 1924, pp. 376–377, 2 figs. Engine brake, ball bearings on crankshaft and camshaft, cast-iron brake shoes in place of lining, and bevel drive are features.

Specifications and Design. Recent Trends in Truck Design. Automotive Industries, vol. 50, no. 8, Feb. 21, 1924, pp. 424–439. American gasoline-truck specifications; British and Continental European truck-chassis specifications.

Two-Ton. London Gen. Omnibus Co. Subsidiary Adds Two-Ton Truck to Present Line, M. W. Bourdon. Automotive Industries, vol. 50, no. 10, Mar. 6, 1924, pp. 550–553, 8 figs. Associated Equipment Co. announces new vehicle designed to operate with low maintenance costs; engine has barrel-type crankcase, inserted cylinder sleeves and ball-bearing crankshaft; first English product of this class to employ battery ignition.

MOTORCYCLES

Horizontal-Frame. The Ner-a-car. Automobile Engr., vol. 14, no. 186, Feb. 1924, pp. 32–38, 12 figs. Describes motorcycle of unconventional design; main departure is use of horizontal frame in place of usual vertical diamond frame which has considerably simplified mounting for engine, transmission and other accessories; two-stroke engine is employed, fitted with combined flywheel magneto.

O

OIL ENGINES

Light-Oil. High-Speed Petrol and Paraffin Engines, J. Okill. Gas & Oil Power, vol. 19, nos. 220 and 221, Jan. 3 and Feb. 7, 1924, pp. 73–74 and 89–90 and 96, 3 figs. Deals with features and management of the lighter fuel types of oil engine.

Scott-Still. The Type of Still Engine Required for Marine Service with Special Reference to the Scott-Still Engine, W. J. Still. North-East Coast Instn. Engrs. & Shipbldrs.—advance paper, no. 2698S, for meeting, Feb. 15, 1924, 25 pp., 17 figs. Discusses use of high-combustion m.e.p.'s and consequent production of excessive heat stresses in cylinder walls; fuel-injection troubles; insufficient ignition temperatures; water-circulation troubles; want of cylinder lubrication and wear of liners; bearing troubles.

OIL FUELS

Bergius Production Process. The Bergius Process (Le Procédé Bergius), P. Erculisse, F. Ranwez and P. Bruylants. Chaleur & Industrie, vol. 4, no. 44, Dec. 1923, pp. 931–943, 13 figs. Study of process which consists essentially in effecting a cracking under high hydrogen pressure; results of tests and practical experiences.

OXY-ACETYLENE WELDING

Brass. The Oxy-Acetylene Torch on Brass Work, D. Baxter. Am. Blacksmith & Motor Shop, vol. 24, no. 2, Feb. 1924, pp. 17–18 and 25, 5 figs. Peculiarities in action of brass under heat that must be considered when applying torch flame, and just how to work brass with gas torch.

Iron Conduit Yokes. Welding Large Iron Castings with the Oxyacetylene Torch. Elec. Ry. Jl., vol. 63, no. 7, Feb. 16, 1924, pp. 245–246, 3 figs. The successful welding of conduit yokes by New York & Harlem R. R.; castings are heated with gas while they are being welded and afterward cooled slowly in annealing ovens; cost of reclaimed yoke one-sixth price of new one.

Machine. Oxy-Acetylene Machine Welding, F. E. Rogers. Acetylene Jl., vol. 25, no. 8, Feb. 1924, pp. 377–380, 8 figs. Application of automatic machines and single and multi-flame welding torches to production work.

Mines. Applications of Oxy-Acetylene Welding and Cutting in the Mining Industry, H. Ulmer. Am. Welding Soc.—Jl., vol. 3, no. 1, Jan. 1924, pp. 2–13. Describes the various applications and shows value of this process in mining industry.

P

PATTERNS

Molding, Construction of. Tool Engineering,

Manufactured by Advertisers

CLASSIFIED LIST OF MECHANICAL EQUIPMENT

Alphabetical List on page 174

Punches, Multiple
* Long & Allstatter Co.
Mackintosh-Hemphill Co.

Punches, Power
* Niagara Machine & Tool Works
* Royersford Fdry. & Mach. Co.

Punches and Dies
* Royersford Fdry. & Mach. Co.

Punching and Coping Machines
* Long & Allstatter Co.

Punching and Shearing Machines
* Long & Allstatter Co.
* Royersford Fdry. & Mach. Co.

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* Frick Co. (Inc.)

Purifiers, Oil
* Bowser, S. F. & Co. (Inc.)
Elliott Co.
Nugent, Wm. W. & Co. (Inc.)

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International Filter Co.
* Scaife, Wm. B. & Sons Co.

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* American Schaeffer & Budenberg Corp'n
* Bristol Co.
* Crosby Steam Gage & Valve Co.
* Superheater Co.
* Taylor Instrument Cos.

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* Tagliabue, C. J. Mfg. Co.

Pyrometers, Optical
* Taylor Instrument Cos.

Pyrometers, Pneumatic
* Uehling Instrument Co.

Pyrometers, Radiation
* Taylor Instrument Cos.

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* James, D. O. Mfg. Co.
* Jones, W. A. Fdry. & Mach. Co.

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* American Radiator Co.
* Smith, H. B. Co.

Railways, Industrial
Easton Car & Construction Co.
Link-Belt Co.

Rams, Hydraulic
* Goulds Mfg. Co.
* Worthington Pump & Machinery Corp'n

Reamers
* Cleveland Twist Drill Co.

Reamers, Adjustable and Expansion
* Cleveland Twist Drill Co.

Receivers, Air
* Ingersoll-Rand Co.
* Scaife, Wm. B. & Sons Co.
* Walsh & Weidner Boiler Co.
* Wheeler Cond. & Engrg. Co.
* Worthington Pump & Machinery Corp'n

Receivers, Ammonia
* Frick Co. (Inc.)

Recorders, CO
* Tagliabue, C. J. Mfg. Co.
* Uehling Instrument Co.

Recorders, CO_2
* Tagliabue, C. J. Mfg. Co.
* Uehling Instrument Co.

Recorders, SO_2
* Tagliabue, C. J. Mfg. Co.
* Uehling Instrument Co.

Recording Instruments
(See Instruments, Recording)

Reducing Motions
* Crosby Steam Gage & Valve Co.

Refractories
* Drake Non-Clinkering Furnace Block Co.
Keystone Refractories Co.
* King Refractories Co. (Inc.)
Maphite Sales Corp'n

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* Frick Co. (Inc.)
* Ingersoll-Rand Co.
Johns-Manville (Inc.)
* Nordberg Mfg. Co.
* Vilter Mfg. Co.
* Vogt, Henry Machine Co.
* Westinghouse Electric & Mfg. Co.

Regulators, Automatic Arc-Furnace
* Westinghouse Elect. & Mfg. Co.

Regulators, Blower
* Foster Engineering Co.
* Mason Regulator Co.

Regulators, Condensation
* Tagliabue, C. J. Mfg. Co.

Regulators, Damper
* Coppus Engineering Corp'n
* Fulton Co.
* Kieley & Mueller (Inc.)
* Mason Regulator Co.

Regulators, Electric
* General Electric Co.
* Westinghouse Electric & Mfg. Co.

Regulators, Fan Engine
* Foster Engineering Co.

Regulators, Feed Water
* Edward Valve & Mfg. Co.
Elliott Co.
* Kieley & Mueller (Inc.)
Squires, C. E. Co.

Regulators, Flow (Steam)
* Schutte & Koerting Co.

Regulators, Humidity
* Fulton Co.
* Tagliabue, C. J. Mfg. Co.

Regulators, Hydraulic Pressure
* Foster Engineering Co.
* Mason Regulator Co.

Regulators, Liquid Level
* Tagliabue, C. J. Mfg. Co.

Regulators, Pressure
* Edward Valve & Mfg. Co.
* Foster Engineering Co.
* Fulton Co.
* General Electric Co.
* Kieley & Mueller (Inc.)
* Mason Regulator Co.
* Tagliabue, C. J. Mfg. Co.
* Taylor Instrument Cos.

Regulators, Pump
(See Governors, Pump)

Regulators, Temperature
* Bristol Co.
* Fulton Co.
* Kieley & Mueller (Inc.)
* Sarco Co. (Inc.)
* Tagliabue, C. J. Mfg. Co.
* Taylor Instrument Cos.

Regulators, Time
* Tagliabue, C. J. Mfg. Co.

Regulators, Vacuum
* Foster Engineering Co.

Reservoirs, Aerating
* Spray Engineering Co.

Resistance Material (Electrical)
Driver-Harris Co.

Revolution Counters
(See Counters, Revolution)

Rings, Weldless
Cann & Saul Steel Co.

Rivet Heaters, Electric
* General Electric Co.

Riveters, Hydraulic
Mackintosh-Hemphill Co.

Riveters, Pneumatic
* Ingersoll-Rand Co.

Riveting Machines
* Long & Allstatter Co.

Roller Bearings
(See Bearings, Roller)

Rolling Mill Machinery
Farrel Foundry & Machine Co.
Mackintosh-Hemphill Co.
Treadwell Engineering Co.

Rolls, Bending
* Niagara Machine & Tool Works

Rolls, Crushing
Farrel Foundry & Machine Co.
Link-Belt Co.
* Worthington Pump & Machinery Corp'n

Rolls, Rubber
* Goodrich, B. F. Rubber Co.
* United States Rubber Co.

Rolls, Steel
Mackintosh-Hemphill Co.

Roofing
Johns-Manville (Inc.)

Roofing, Asbestos
Johns-Manville (Inc.)

Rope, Hoisting
Clyde Iron Works Sales Co.
* Roebling's, John A. Sons Co.

Rope, Transmission
Hill Clutch Machine & Fdry. Co.
Link-Belt Co.
* Roebling's, John A. Sons Co.

Rope, Wire
Clyde, Iron Works Sales Co.
Hill Clutch Machine & Fdry. Co.
* Roebling's, John A. Sons Co.

Rope Drives
* Allis-Chalmers Mfg. Co.
* Brown, A. & F. Co.
* Falls Clutch & Machinery Co.
Hill Clutch Machine & Fdry. Co.
Link-Belt Co.
* Medart Co.
* Wood's, T. B. Sons Co.

Rubber Goods, Mechanical
* Goodrich, B. F. Rubber Co.
* Jenkins Bros.
* United States Rubber Co.

Rubber Mill Machinery
Farrel Foundry & Machine Co.

Sand Blast Apparatus
* De La Vergne Machine Co.

Saw Mill Machinery
* Allis-Chalmers Mfg. Co.

Saw Mills, Portable
* Frick Co. (Inc.)

Scales, Fluid Pressure
* Crosby Steam Gage & Valve Co.

Screens, Perforated Metal
* Hendrick Mfg. Co.

Screens, Revolving
* Allis-Chalmers Mfg. Co.
Chain Belt Co.
* Gifford-Wood Co.
* Hendrick Mfg. Co.
Link-Belt Co.
* Smidth, F. L. & Co.

Screens, Shaking
* Allis-Chalmers Mfg. Co.
Chain Belt Co.
* Gifford-Wood Co.
* Hendrick Mfg. Co.
Link-Belt Co.

Screens, Water Intake (Traveling)
Chain Belt Co.
Link-Belt Co.

Screw Cutting Dies
(See Dies, Thread Cutting)

Screw Machine Products
* National Acme Co.

Screw Machines, Automatic
* National Acme Co.

Screw Machines, Hand
* Jones & Lamson Mch. Co.
* Warner & Swasey Co.

Screws, Cap
* National Acme Co.
* Scovill Mfg. Co.

Screws, Safety Set
Allen Mfg. Co.
* Bristol Co.

Screws, Set
Allen Mfg. Co.
* National Acme Co.

Separators, Ammonia
* De La Vergne Machine Co.
Elliott Co.
* Frick Co. (Inc.)
* United Machine & Mfg. Co.
* Vogt, Henry Machine Co.

Separators, Compressed Air
* United Machine & Mfg. Co.

Separators, Oil
Bethlehem Shipbldg.Corp'n (Ltd.)
* Cochrane Corp'n
* Crane Co.
* De La Vergne Machine Co.
Elliott Co.
Hoppes Mfg. Co.
* Kieley & Mueller (Inc.)
* United Machine & Mfg. Co.
* Vogt, Henry Machine Co.

Separators, Steam
* Cochrane Corp'n
* Crane Co.
Elliott Co.
Hoppes Mfg. Co.
* Kieley & Mueller (Inc.)
* Pittsburgh Valve, Fdry. & Const. Co.
* United Machine & Mfg. Co.
* Vogt, Henry Machine Co.

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* Allis-Chalmers Mfg. Co.
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Cumberland Steel Co.
* Falls Clutch & Mchry. Co.
* Medart Co.
Union Drawn Steel Co.
* Wood's, T. B. Sons Co.

Shafting, Cold Drawn
Hill Clutch Machine & Fdry. Co.
* Medart Co.

Shafting, Flexible
* Gwilliam Co.

Shafting, Turned and Polished
Cumberland Steel Co.
Hill Clutch Machine & Fdry. Co.
Link-Belt Co.

Shapes, Brick
* McLeod & Henry Co.

Shapes, Cold Drawn Steel
Union Drawn Steel Co.

Shears, Alligator
Farrel Foundry & Machine Co.
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* Royersford Foundry & Machine Co.

Shears, Hydraulic
Mackintosh-Hemphill Co.

Shears, Plate
* Long & Allstatter Co.
Mackintosh-Hemphill Co.

Shears, Rotary
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* Jones, W. A. Fdry. & Mach. Co.
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Mackintosh-Hemphill Co.
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* Nordberg Mfg. Co.
* Wood's, T. B. Sons Co.

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* Allington & Curtis Mfg. Co.
* Hendrick Mfg. Co.

Sheet Metal Working Machinery
Farrel Foundry & Machine Co.
* Niagara Machine & Tool Works

Sheets, Brass
* Scovill Mfg. Co.

Sheets, Bronze
* Hendrick Mfg. Co.

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* Goodrich, B. F. Rubber Co.
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* Sarco Co. (Inc.)

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(See Stacks, Steel)

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(See Wire Rope Fastenings)

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Diamond Power Specialty Corp'n

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DuPont Engineering Co.
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Sprinklers, Spray
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* Hendrick Mfg. Co.
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* Titusville Iron Works Co.
* Union Iron Works
* Vogt, Henry Machine Co.
* Walsh & Weidner Boiler Co.

Stair Treads
* Irving Iron Works Co.

Stampings, Sheet Metal
Rockwood Sprinkler Co.

*Catalogue data of firms marked * appear in the A.S.M.E. Condensed Catalogues of Mechanical Equipment, 1923-24 Volume*

A. A. Dowd and F. W. Curtis. Am. Mach., vol. 60, no. 10, Mar. 6, 1924, pp. 365–368, 4 figs. Pattern work and its relation to designer; importance of shape of pattern; methods of molding; construction of flanged patterns.

PIPE

Joints. The Victaulic System of Pipe Jointing. Engineering, vol. 117, no. 3033, Feb. 15, 1924, pp. 205–206, 4 figs. Describes modifications in Victaulic joint since first put on market and its advantageous features, among which is its flexibility.

Thermal Efficiency and Pipe Diameter. Thermal Efficiency and Pipe Diameter (Wärmeleistung und Rohrdurchmesser), H. Fichtl. Gesundheits-Ingenieur, vol. 47, no. 4, Jan. 26, 1924, pp. 25–26, 3 figs. Calculation of hourly heat abstraction from pipe from its diameter.

PIPE, CAST-IRON

Census of Manufactures. Cast-Iron Pipe. U. S. Bur. Census, 1923, 7 pp. Census of manufactures, covering operations of manufacturing establishments during 1921.

PIPE COVERINGS

Steam-Pipe. Radiation Losses. Eng. & Boiler House Rev., vol. 37, no. 8, Mar. 1924, pp 286–287, 2 figs. Saving to be effected by suitable and efficient steam pipe covering.

PIPE, STEEL

Failure. High-Head Penstock Failure Found Due to Bad Steel. Power, vol. 59, no. 10, Mar. 4, 1924, pp. 373–374, 1 fig. Section of 30-in. pipe for 1909-ft. head ruptures through laminated end of plate; welds not affected.

PLATES

Cast-Iron, Production of. Making Large Cast-Iron Plates, F. C. Edwards. Metal Industry (Lond.), vol. 24, no. 7, Feb. 15, 1924, pp. 153–154, 2 figs. Describes practice successfully followed at a foundry where large quantities are made.

POLISHING

Tumbling and Burnishing. Tumbling and Burnishing, B. G. Krause. Machy. (N. Y.), vol. 30, no. 7, Mar. 1924, pp. 501–502, 1 fig. Types of tumbling barrels; tumbling media or materials; ball-burnishing practice; plating and japanning; examples of work suitable for tumbling and burnishing.

POWER GENERATION

Economical Operation. Increasing Efficiencies in Power Generation, R. W. Angus. Power House, vol. 17, no. 4, Feb. 20, 1924, pp. 22–24, 3 figs. Improvements in economical operation of power by steam; modern trend to be toward higher pressures with less superheat, and multi-stage feedwater heating processes.

PRESSWORK

Drawing-Press Tools. The Calculation of Draw-Press Tools (Die Berechnung von Ziehwerkzeugen), W. Sellin. Maschinenbau, vol. 3, no. 9, Feb. 14, 1924, pp. 229–235, 10 figs. Discusses most accurate method of determining diameter of blank; calculation of punch diameter; development of proper relation between diameter of shell and drawing depth.

PULVERIZED COAL

Boiler Firing with. An Investigation of Powdered Coal As Fuel for Power-Plant Boilers, H. Kreisinger, J. Blizard, C. E. Augustine and B. J. Cross. U. S. Bur. Mines, Bul. 223, 1923, 90 pp., 48 figs. Results of 36 tests made on a 468-hp. Edge Moor boiler fired with pulverized coal at Oneida St. Station of Milwaukee Elec. Ry. & Light Co., Milwaukee, Wis., to determine what overall boiler efficiency could be obtained with pulverized coal under various conditions of furnace operation and with coal of different fineness and moisture content.

Combustion. The Combustion of Pulverized Coal, E. Audibert. Fuel, vol. 3, no. 13, Feb. 1924, pp. 56–62, 4 figs. Account of results obtained in research carried out by Le Comité Centrale des Houillères de France; experimental arrangements; duration of combustion; inflammation of dust clouds; combustion chamber.

The Combustion Process in Pulverized-Coal Furnaces (Der Verbrennungsvorgang in der Kohlenstaubfeuerung), Wm. Nusselt. Zeit. des Vereines deutscher Ingenieure, vol. 68, no. 6, Feb. 9, 1924, pp. 124–128. Points out that process of combustion falls in two parts both of which are explained; by use of law of heat transmission and diffusion, formulas are obtained for both parts of process, so that time of ignition and duration of combustion of blown-in fuel can be calculated.

Velocity of Particles Falling in Air. The Terminal Velocity of Particles of Powdered Coal Falling in Air or Other Viscous Fluid. J. Blizard. Franklin Inst.—JL., vol. 197, no. 2, Feb. 1924, pp. 199–208, 1 fig. Shows how velocity is affected by size and density of particle and density and viscosity of gaseous medium in which it falls. Terminal velocity acquired by a particle of powdered coal falling in combustion chamber of a furnace is important factor determining rate at which particle burns, for the higher the velocity the more rapidly will a fresh supply of oxygen be brought to its surface. Conclusions reached applicable to estimation of velocity with which small particles other than coal fall in fluids.

PUMPING PLANTS

Million-Gallon, for Railway Service. Southern Pacific Completes Million Gallon Pumping Plant. Ry. Eng. & Maintenance, vol. 20, no. 3, Mar. 1924, pp. 105–107, 5 figs. Large air-lift system at El Paso proves big improvement over prior arrangement.

PUMPS

Gasoline. The "Shell" Kerbside Petrol Pump. Engineering, vol. 117, no. 3036, Mar. 7, 1924, pp. 301–304, 10 figs. Gasoline is raised from underground tank by hand-operated, semi-rotary pump and delivered into one or other of two measuring vessels, or containers, through four-way plug cock.

R

RAILS

Corrugation. Rail Corrugation Experience. Elec. Ry. Jl., vol. 63, no. 7, Feb. 16, 1924, pp. 255–260, 7 figs. Survey of railways in various parts of United States, giving new data as to extent of this trouble; practices followed in removing and cost, and comments as to causes.

Joint Welding. Investigation of Seam Welded Rail Joints, R. B. Fehr. Am. Welding Soc.—Jl., vol. 3, no. 1, Jan. 1924, pp. 28–60, 17 figs. Results of investigation along following lines: Functions of seam-welded rail joints and stresses to which they are subjected; improvements in joint structure and welding processes; development of practical method for making accelerated tests on seam-welded joints; and comparative tests on seam-welded joints in which variations have been made in either mechanical structure or welding process.

Progress Report No. 2 of Committee on Welded Rail Joints. Am. Welding Soc.—Jl., vol. 3, no. 2, Feb. 1924, pp. 48–88, 28 figs. Report of committee organized by Am. Elec. Ry. Assn. and Am. Bur. of Welding, to investigate various types of welded rail joints in commercial use. Summary of tests.

Joints. A Non-Deflecting Rail Joint. Indian Eng., vol. 75, nos. 1 and 2, Jan. 5 and 12, 1924, pp. 10–11 and 24–25, 10 figs. on supp. plates. Details of joint proposed by Bradford Leslie.

Neafie Improved Rail Joint. Ry. Rev., vol. 74, no. 11, Mar. 15, 1924, pp. 524–525, 4 figs. Describes joint designed, by A. J. Neafie, with a heavy base plate which is supported by two ties.

Wheel Thrust on. Otheograph Records of Steam and Electric Locomotives, P. M. Gillilan. Gen. Elec. Rev., vol. 27, no. 3, Mar. 1924, pp. 179–181, 7 figs. Notes on a device for recording thrust on rails by each separate wheel of a locomotive or motor car; shows by a graphic record amplitude and characteristic of both vertical and transverse thrust of all wheels on each tie. Describes records made.

Othecographic Records of Wheel Effects on Rails. Eng. News-Rec., vol. 92, no. 11, Mar. 13, 1924, pp. 441–442, 5 figs. Tests of electric and steam locomotives; charts show load and lateral thrust imposed by each passing wheel.

RAILWAY ELECTRIFICATION

S. African Ry. The Electrification of the South African Railways, W. Hoy. S. African Eng., vol. 35, no. 1, Jan. 1924, pp. 3–5, 6 figs. Main features of conversion from steam to electric operation of portion of line from Glencoe Junction to Pietermaritzburg, bringing progress of work up to November.

RAILWAY MAINTENANCE

Expense Analysis. Analysis of Equipment Maintenance Expenses, J. L. White. Ry. Age, vol. 76, no. 9, Mar. 1, 1924, pp. 507–510. Reviews information available in accounts and explains methods for its use.

RAILWAY MANAGEMENT

Store-Department Methods. Functions of the Store Department, U. K. Hall. New England Railroad Club, Jan. 8, 1924, pp. 214–225 and (discussion) 225–240. Discusses functions, including supply-train service, shop delivery, reclamation, etc.

RAILWAY MOTOR CARS

Gasoline. Two-Unit Motor Train for Mississippi Central. Ry. Elec. Engr., vol. 15, no. 2, Feb. 1924, pp. 43–45, 3 figs. Description of two-car gasoline-driven train, built by Four Wheel Drive Auto Co. Clintonville, Wis., which will operate from Hattiesburg to Beaumont, Miss.; motor unit provides space for baggage and seats for 12 passengers, and trailer seats 34 passengers; electric lighting circuits patterned after standard automobile practice.

German. Railway Motor Cars. Eng. Progress, vol. 5, no. 1, Jan. 1924, pp. 18–20, 4 figs. Cars designed by German Gen. Elec. Co. (AEG) in conjunction with Nat. Automobile Co. (NAG), Berlin, having 6-cylinder, 4-cycle engine with output of 50 to 75 hp. at 950 r.p.m.; advantages claimed for cars.

Steam. The "Sentinel-Cammell" Steam Rail Coach in Service. Ry. Gaz., vol. 40, no. 9, Feb. 29, 1924, pp. 277–279, 7 figs. Results of a demonstration carried out on system of Jersey Rys. & Tramways Co. on Feb. 20, 1924. Economies effected since its introduction.

RAILWAY OPERATION

Fuel Economy. Conservation of Fuel in Railway Operation, W. E. Symons. Ry. & Locomotive Eng., vol. 37, no. 2, Feb. 1924, pp. 41–49, 5 figs. Comparison of statistical items of 30 steam railways; hours of time each day under way earning revenue; locomotive improvements.

Point Operation and Control. Point Operation at Marshalling Yards. Ry. Gaz., vol. 40, no. 5, Feb. 1, 1924, pp. 137–143, 11 figs. Description of Aster electrical equipment installed at yards of Northern Railway of France, which insures rapid and economical shunting movements.

Train Control. Train Control Company Improves Air Apparatus. Ry. Elec. Engr., vol. 15, no. 3, Mar. 1924, pp. 81–83, 3 figs. Description of functions of the different pieces of pneumatic apparatus in train control system of Indiana Equipment Corp., of Indianapolis, Ind.; develops valves to give graduated reduction of brake pipe pressure.

Train Operation with Automatic Control, C. & O. Ry. Ry. Rev., vol. 74, no. 10, Mar. 8, 1924, pp. 449–461, 25 figs. Describes automatic train control, and signal system, both operated by alternating current; signals are three-indication color-light automatic block signals of absolute-permissive type.

RAILWAY REPAIR SHOPS

London Underground Railways. The Acton Works of the Underground Railways. Engineer, vol. 137, no. 3555, Feb. 15, 1924, pp. 172–174, 8 figs. partly on p. 176. Details of central repair shop which will eventually serve for overhauling of rolling stock belonging to Metro. District, London Elec. & City and South and Central London railways. See also Ry. Gaz., vol. 40, no. 7, Feb. 15, 1924, pp. 195–202, 18 figs.; and Engineering, vol. 117, nos. 3033 and 3034, Feb. 15 and 22, 1924, pp. 195–202, and 229–234 and 240, 53 figs. partly on p. 208 and supp. plate.

RAILWAY SIGNALING

Automatic. Automatic Signals for a Railroad Grade Crossing. Ry. Age, vol. 76, no. 15, Mar. 15, 1924, pp. 735–738, 3 figs. Satisfactory for thin traffic; home and distant signals arranged on "normal danger" plan.

Development. Development of Railway Signaling, K. E. Kellenberger. Ry. Signaling, vol. 17, no. 2, Feb. 1924, pp. 60–64, 5 figs. Discusses manual block and automatic block systems, interlocking, track circuit, recent developments in signaling, and automatic train control. Paper read before Springfield Engrs. Club.

Interlocking. Operating Features of Electric Interlocking. Ry. Rev., vol. 74, no. 11, Mar. 15, 1924, pp. 510–515, 10 figs. Recent developments of this type of mechanism which introduce refinements of detail contributing to operating efficiency.

Lock-and-Block Working. The "Syx" Improved Electric Lock-and-Block System. Ry. Gaz., vol. 40, no. 7, Feb. 15, 1924, pp. 203–204, 2 figs. Describes style L, type B apparatus.

RAILWAY TIES

Comparison of Types. Railway Sleepers, F. H. Clark. Assn. Chinese & Am. Engrs.—Jl., vol. 4, no. 9, Nov. 1923, pp. 6–13. Present conditions in China; efforts made in other countries to secure better or less expensive supply of ties; how experience and research of other countries can be advantageously applied to conditions in China.

Reinforced-Concrete. The Utilization of Reinforced-Concrete Ties (Utilisation de traverses en béton de ciment armé), M. Adam. Revue Générale des Chemins de Fer, vol. 43, no. 2, Feb. 1924, pp. 105–113, 9 figs. Discusses their employment for reducing maintenance expenses of secondary lines; experiences of the Orléans Co. with concrete ties on 21-km. line section between Hautefort and Terrasson.

Steel, Corrosion of. The Causes of Premature Failure of Ribbed Ties (Ueber die Ursachen der vorzeitigen Zerstörung von Rippenschwellen), R. Kühnel and G. Marzahn. Stahl u. Eisen, vol. 44, no. 7, Feb. 14, 1924, pp. 175–178, 4 figs. Describes nature of damages occurring in railway ties; chemical investigation; investigation of mechanical properties and of structure; main cause of corrosion is attributed to poor design; protection of ties against corrosion.

RAILWAY TRACK

Curves. The Cubic Transition Railway Spiral, M. K. Rice-Oxley. Instn. Civ. Engrs.—Sessional Notices, no. 3, Feb. 1924, pp. 73–74. Author derives suitable curve and endeavors to show how it may be set out by rectangular offsets or by theodolite without use of tables or complicated formulas. (Abstract.)

Economic Layout. The Function of Steam Consumption and the Economic Layout of Railway Lines (Die Dampfverbrauchsfunktion und die wirtschaftliche Linienführung der Bahnen), W. G. Waffenschmidt. Bauingenieur, vol. 5, no. 2, Jan. 31, 1924, pp. 23–27, 8 figs. Attempt is made to compare the economic efficiency of lines without use of virtual lengths.

Grade Reduction vs. Heavier Power. Grade Reduction or Heavier Power. Ry. Rev., vol. 74, no. 11, Mar. 15, 1924, pp. 509–510. Appendix A, preliminary report of Committee on Economics of Railway Location, Am. Ry. Eng. Assn.

Inspection Car. Track Inspection on the Erie R. R. Ry. Rev., vol. 74, no. 11, Mar. 15, 1924, pp. 503–508, 11 figs. Describes special car designed and built for better track inspection, by reconstructing a passenger car, and fitted with instruments which record all low joints, line and surface, gage and lurches; charts made by car are blueprinted and copies of their respective sections sent to track foremen to locate and correct defects recorded.

Maintenance. How the Illinois Central Uses Labor More Efficiently, G. M. O'Fourke. Ry. Eng. & Maintenance, vol. 20, no. 3, Mar. 1924, pp. 99–100. Detailed programs, concentration on specific tasks, and analysis of methods increase output; how section work was scheduled; another method of making time studies.

Snow-Protecting Structures. Snow-Protecting Structures for High Altitude Railways (Sneforbygninger paa Höifjeldsbaner), G. R. Lorange. Teknisk Ukeblad, vol. 17, nos. 5 and 6, Feb. 1 and 8, 1924, pp. 45–47 and 56–59, 17 figs. Describes a number of wooden structures designed to keep snow off railway tracks in very effective ways.

Track-Bolt Specifications. Specifications for Quenched Carbon Steel and Alloy Steel Track Bolts. Am. Ry. Eng. Assn.—Bul., vol. 25, no. 263, Jan. 1924, pp. 403–405. Specification covering materials, chemical and physical requirements, design and tolerance, manufacture, inspection, and marking.

Manufactured by Advertisers — CLASSIFIED LIST OF MECHANICAL EQUIPMENT — Alphabetical List on page 174

Standpipes
* Cole, R. D. Mfg. Co.
Morrison Boiler Co.
* Walsh & Weidner Boiler Co.

Static Condensers
* Westinghouse Elect. & Mfg. Co.

Steam Specialties
* Crane Co.
* Foster Engineering Co
* Fulton Co.
* Kieley & Mueller (Inc.)
Lunkenheimer Co.
* Pittsburgh Valve, Fdry. & Const. Co.
* Sarco Co. (Inc.)

Steel, Alloy
Cann & Saul Steel Co.
Union Drawn Steel Co.

Steel, Bar
Cann & Saul Steel Co.

Steel, Bright Finished
Union Drawn Steel Co.

Steel, Cold Drawn
Union Drawn Steel Co.

Steel, Cold Rolled
Cumberland Steel Co.
Union Drawn Steel Co.

Steel, Nickel
Union Drawn Steel Co

Steel, Open-Hearth
* Falk Corporation
Union Drawn Steel Co.

Steel, Rock Drill
* Ingersoll-Rand Co.

Steel, Screw, Cold Drawn
Union Drawn Steel Co.

Steel, Strip (Cold Rolled)
Driver-Harris Co.

Steel, Tool
Cann & Saul Steel Co.

Steel, Vanadium
Union Drawn Steel Co.

Steel Plate Construction
Bethlehem Shipbldg.Corp'n (Ltd)
* Bigelow Co.
* Burhorn, Edwin Co.
* Casey-Hedges Co.
* Cole, R. D. Mfg. Co.
* Graver Corp'n
* Hendrick Mfg. Co.
* Keeler, E. Co.
Morrison Boiler Co.
Steere Engineering Co.
* Titusville Iron Works Co.
* Union Iron Works
* Vogt, Henry Machine Co.
* Walsh & Weidner Boiler Co.

Steps, Ladder & Stair (Non-Slipping)
* Irving Iron Works Co.

Stills
* Vogt, Henry Machine Co.

Stocks and Dies
* Landis Machine Co. (Inc.)

Stokers, Chain Grate
* Babcock & Wilcox Co.
* Combustion Engineering Corp'n
* Westinghouse Electric & Mfg. Co.

Stokers, Overfeed
* Detroit Stoker Co.
* Riley, Sanford Stoker Co.
* Westinghouse Electric & Mfg. Co.

Stokers, Traveling Grate, Anthracite
* United Machine & Mfg. Co.

Stokers, Underfeed
* American Engineering Co.
* Combustion Engineering Corp'n
* Detroit Stoker Co.
* Riley, Sanford Stoker Co.
* Sturtevant, B. F. Co.
* United Machine & Mfg. Co.
* Westinghouse Electric & Mfg. Co.

Strainers, Oil
* Bowser, S. F. & Co. (Inc.)
* Mason Regulator Co.

Strainers, Steam
* Foster Engineering Co.
* Kieley & Mueller (Inc.)
* Mason Regulator Co.

Strainers, Water
Elliott Co.
* Foster Engineering Co.
* Kieley & Mueller (Inc.)
* Mason Regulator Co.
* Schutte & Koerting Co.

Strainers, Water (Traveling)
Link-Belt Co.

Structural Steel Work
* Hendrick Mfg. Co.
* Walsh & Weidner Boiler Co.

Sugar Machinery
Farrel Foundry & Machine Co.
* Walsh & Weidner Boiler Co.

Superheaters, Steam
* Babcock & Wilcox Co.
* Power Specialty Co.
* Superheater Co.

Superheaters, Steam (Locomotive)
* Power Specialty Co.
* Superheater Co.

Superheaters, Steam (Marine)
* Power Specialty Co.
* Superheater Co.

Switchboards
* General Electric Co.
* Westinghouse Electric & Mfg. Co.

Switches and Frogs
Atlas Car & Mfg. Co.

Switches, Electric
* General Electric Co.
* Westinghouse Electric & Mfg. Co.

Synchronous Converters
(See Converters, Synchronous)

Tables, Drawing
Dietzgen, Eugene Co.
Economy Drawing Table & Mfg. Co.
Keuffel & Esser Co.
New York Blue Print Paper Co.
ParVell Laboratories
U. S. Blue Co.
Weber, F. Co. (Inc.)

Tachometers
* American Schaeffer & Budenberg Corp'n
* Bristol Co.
Veeder Mfg. Co.

Tachoscopes
* American Schaeffer & Budenberg Corp'n

Tanks, Acid
* Graver Corp'n
* Walsh & Weidner Boiler Co.

Tanks, Ice
* Frick Co. (Inc.)
* Graver Corp'n

Tanks, Oil
* Graver Corp'n
* Hendrick Mfg. Co.
Morrison Boiler Co.
Nugent, Wm. W. & Co. (Inc.)
* Scaife, Wm. B. & Sons Co.
* Titusville Iron Works Co.
* Walsh & Weidner Boiler Co.

Tanks, Pressure
* Graver Corp'n
* Hendrick Mfg. Co
Morrison Boiler Co.
* Titusville Iron Works Co.
* Vogt, Henry Machine Co.
* Walsh & Weidner Boiler Co.

Tanks, Steel
Bethlehem Shipbldg.Corp'n (Ltd.)
* Bigelow Co.
* Casey-Hedges Co.
* Cole, R. D. Mfg. Co.
* Graver Corp'n
* Hendrick Mfg. Co.
Morrison Boiler Co.
* Scaife, Wm. B. & Sons Co.
* Titusville Iron Works Co.
* Union Iron Works
* Vogt, Henry Machine Co.
* Walsh & Weidner Boiler Co.

Tanks, Storage
* Cochrane Corp'n
* Cole, R. D. Mfg. Co.
* Combustion Engineering Corp'n
* Graver Corp'n
* Hendrick Mfg. Co.
Morrison Boiler Co.
Nugent, Wm. W. & Co. (Inc.)
* Scaife, Wm. B. & Sons Co.
* Titusville Iron Works Co.
* Vogt, Henry Machine Co.
* Walsh & Weidner Boiler Co.

Tanks, Tower
* Graver Corp'n
* Walsh & Weidner Boiler Co.

Tanks, Welded
* Cole, R. D. Mfg. Co.
* Graver Corp'n
Morrison Boiler Co.
* Scaife, Wm. B. & Sons Co.

Tap Extensions
Allen Mfg. Co.

Tapping Attachments
* Whitney Mfg. Co.

Taps, Collapsing
* National Acme Co.

Temperature Regulators
(See Regulators, Temperature)

Testing Laboratories, Cement
* Smidth, F. L. & Co.

Textile Machinery
* Franklin Machine Co.

Thermometers
* American Schaeffer & Budenberg Corp'n
* Ashton Valve Co.
* Bristol Co.
* Sarco Co. (Inc.)
* Tagliabue, C. J. Mfg. Co.
* Taylor Instrument Cos.

Thermometers, Chemical
* Tagliabue, C. J. Mfg. Co.

Thermometers, Distance
* Taylor Instrument Cos.

Thermometers, High Range (Recording)
* Bailey Meter Co.
* Tagliabue, C. J. Mfg. Co.
* Taylor Instrument Cos.

Thermometers, Industrial
* Tagliabue, C. J. Mfg. Co.

Thermostats
* Bristol Co.
* Fulton Co.
* General Electric Co.

Thread Cutting Tools
* Crane Co.
* Jones & Lamson Machine Co.
* Landis Machine Co. (Inc.)

Threading Machines
* National Acme Co.

Threading Machines, Pipe
* Landis Machine Co. (Inc.)

Tie Tamping Outfits
* Ingersoll-Rand Co.

Time Recorders
* Bristol Co.

Tinsmiths' Tools and Machines
* Niagara Machine & Tool Works

Tipples, Steel
Link-Belt Co.

Tobacco Machinery
* American Machine & Foundry Co.

Tongs, Crane
* Kenworthy, Chas. F. (Inc.)

Tools, Brass-Working Machine
* Warner & Swasey Co.

Tools, Machinist's Small
* Atlas Ball Co.
* Cleveland Twist Drill Co.

Tools, Pneumatic
* Ingersoll-Rand Co.

Tools, Special
DuPont Engineering Co.

Tracks, Industrial Railway
Easton Car & Construction Co.

Tractors
* Allis-Chalmers Mfg. Co.

Tractors, Industrial (Storage Battery)
Atlas Car & Mfg. Co.
Baker R. & L. Co.
* Elwell-Parker Electric Co.
* Yale & Towne Mfg. Co.

Tractors, Turntable
* Whiting Corp'n

Trailers, Industrial
* Elwell-Parker Electric Co.
* Yale & Towne Mfg. Co.

Tramrail Systems, Overhead
* Brown Hoisting Machinery Co.
Link-Belt Co.
Reading Chain & Block Corp'n
* Whiting Corp'n

Tramways, Bridge
Link-Belt Co.

Tramways, Wire Rope
Clyde Iron Works Sales Co.
Lidgerwood Mfg. Co.
* Roebling's, John A. Sons Co.

Transfer Tables
* Whiting Corp'n

Transformers, Electric
* Allis-Chalmers Mfg. Co.
* General Electric Co.
* Westinghouse Electric & Mfg. Co.

Transmission Machinery
(See Power Transmission Machinery)

Transmissions, Automobile
* Foote Bros. Gear & Machine Co.

Transmissions, Variable Speed
* American Fluid Motors Co.

Traps, Radiator
* American Radiator Co.
* Sarco Co. (Inc.)

Traps, Return
* American Blower Co.
* Crane Co.
* Kieley & Mueller (Inc.)

Traps, Steam
* American Blower Co.
* American Schaeffer & Budenberg Corp'n
* Crane Co.
Elliott Co.
* Jenkins Bros.
Johns-Manville (Inc.)
* Kieley & Mueller (Inc.)
* Reading Steel Casting Co. (Inc.)
(Pratt & Cady Division)
* Reliance Gauge Column Co.
* Sarco Co. (Inc.)
* Schutte & Koerting Co.
Squires, C. E. Co.
* Vogt, Henry Machine Co.

Traps, Vacuum
* American Blower Co.
* American Schaeffer & Budenberg Corp'n
* Crane Co.
* Sarco Co. (Inc.)

Treads
* Irving Iron Works Co.

Treads, Stair (Rubber)
* United States Rubber Co.

Trolleys
* Brown Hoisting Machinery Co
Reading Chain & Block Corp'n
* Whiting Corp'n

Trucks, Elevating
Atlas Car & Mfg. Co.
Baker R. & L. Co.

Trucks, Industrial
* Elwell-Parker Electric Co.

Trucks, Industrial (Storage Battery)
Baker R. & L. Co.
* Elwell-Parker Electric Co.
* Yale & Towne Mfg. Co.

Trucks, Oven
* Elwell-Parker Electric Co.

Trucks, Swivel Hoist, Electric
* Elwell-Parker Electric Co.

Trucks, Trailer
* Elwell-Parker Electric Co.
* Yale & Towne Mfg. Co.

Tubes, Boiler, Seamless Steel
* Casey-Hedges Co.

Tubes, Condenser
* Scovill Mfg. Co.
* Wheeler Condenser & Engrg. Co.

Tubes, Pitot
* American Blower Co.
Bacharach Industrial Instrument Co.

Tubing, Rubber
* Goodrich, B. F. Rubber Co
* United States Rubber Co.

Tubing, Rubber (Hard)
* Goodrich, B. F. Rubber Co.

Tumbling Barrels
Farrel Foundry & Machine Co.
* Royersford Fdry. & Mach. Co.
* Whiting Corp'n

Turbines, Hydraulic
* Allis-Chalmers Mfg. Co.
* Cramp, Wm. & Sons Ship & Engine Bldg. Co.
Hoppes Water Wheel Co.
* Leffel, James & Co.
Newport News Shipbuilding & Dry Dock Co.
Smith, S. Morgan Co.
* Worthington Pump & Mchry. Corp'n

Turbines, Steam
* Allis-Chalmers Mfg. Co.
* Coppus Engineering Corp'n
* De Laval Steam Turbine Co
* General Electric Co.
* Kerr Turbine Co.
Ridgway Dynamo & Engine Co.
* Sturtevant, B. F. Co.
* Terry Steam Turbine Co.
* Westinghouse Elec. & Mfg. Co
* Wheeler Condenser & Engrg. Co

Turbo-Blowers
* Coppus Engineering Corp'n
* General Electric Co.
* Ingersoll-Rand Co.
* Kerr Turbine Co.
* Sturtevant, B. F. Co.

Turbo-Compressors
* Ingersoll-Rand Co.

Turbo-Generators
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* De Laval Steam Turbine Co.
* General Electric Co.
* Kerr Turbine Co.
Ridgway Dynamo & Engine Co.
* Sturtevant, B. F. Co.
* Terry Steam Turbine Co.
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Turbo-Pumps
Bethlehem Shipbldg.Corp'n (Ltd.)
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* Kerr Turbine Co.
* Terry Steam Turbine Co.
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Turntables
Atlas Car & Mfg. Co.
Easton Car & Construction Co.
Link-Belt Co.
* Whiting Corp'n

Turret Machines
(See Lathes, Turret)

*Catalogue data of firms marked * appear in the A.S.M.E. Condensed Catalogues of Mechanical Equipment, 1923-24 Volume*

RAILWAY YARDS

Switching. A Proposed Catapult Switching Yard, F. W. Eagelston. Eng. & Contracting (Railways), vol. 61, no. 2, Feb. 20, 1924, pp. 409–414, 4 figs. Economic necessity of some radical improvement in present methods of switching freight cars. Description of novel process and means devised by author.

RAILWAYS

Committee Reports, A. R. E. A. American Railway Engineering Association Meeting. Eng. News-Rec., vol. 92, no. 12, Mar. 20, 1924, pp. 481–483. Review of reports on economics and standards; rails and joints; track material and maintenance; bridges and trestles; water and fuel supply, stations and buildings. See also Abstracts of Committee Reports, pp. 491–493.

Equipment Depreciation. Depreciation of Railway Equipment, J. E. Muhlfeld. Ry. & Locomotive Eng., vol. 37, no. 2, Feb. 1924, pp. 41–49, 5 figs. Depreciation accounts; physical condition of composite properties such as locomotives and cars.

Valuation. Railroad Valuation, A Brief Survey, Wm. D. Pence. Eng. News-Rec., vol. 92, no. 10, Mar. 6, 1924, pp. 406–408. Outline sketch of origin and growth of valuation movement leading up to Federal Act, what has been achieved to date, and present-day prospects for useful outcome.

Water Pick-Up Systems. Water Troughs on the Great Western Railway. Ry. Gaz., vol. 40, no. 6, Feb. 8, 1924, pp. 168–172, 6 figs. Standard permanent way with cross-ties used; troughs shaped with inturned edges at top to reduce splashing when water is being taken up by locomotive.

REFRACTORIES

Conductivity and Specific Heat. Conductivity and Specific Heat of Refractories at High Temperatures, M. D. Hersey and E. W. Butzler. U. S. Bur. Mines, Reports of Investigations, No. 2564, Jan. 1924, 7 pp. General statement of problem, with results on Georgia firebrick to 1700 deg. fahr.

Open-Hearth-Furnace Linings. Compare Steel Refractories, E. C. Kreutzberg. Foundry, vol. 52, no. 5, Mar. 1, 1924, pp. 175–176. Suggestions for improving qualities, methods of construction and maintenance of open-hearth furnace linings; problems of electric-furnace materials. Abstract from discussion at meeting of Am. Ceramic Soc.

Refuse Firebrick, New Use for. New Use for Refuse Refractory Material, S. F. Walton. Iron Age, vol. 113, no. 11, Mar. 13, 1924, pp. 786–788, 4 figs. Old fireclay brickbats ground up with bond to form highly refractory mortar; cost reported low.

Steel Works. Refractory Materials for Steelworks Chem. Age (Lond.), vol. 10, no. 242, Feb. 2, 1924, pp. 10–12, 4 figs. Their uses and essential properties they should possess in order to insure satisfactory results.

REFRIGERANTS

Ethyl Chloride. The Thermal Properties of Ethyl Chloride, C. J. Jenkin and D. N. Shorthose. Refrig. Eng., vol. 10, no. 8, Feb. 1924, pp. 313–318, 3 figs. Results of research carried out at Eng. Lab. in Oxford for Eng. Committee of Food Investigation Board. From Special Report No. 14 of Dept. Sci. & Indus. Research of Great Britain.

REFRIGERATING MACHINES

Absorption. The Absorption Ice Machine, H. A. Cranford. Southern Engr., vol. 40, no. 6, and vol. 41, no. 1, Feb. and Mar. 1924, pp. 38–42 and 38–40, 9 figs. Pointers on purchasing; the various apparatus comprising the system; handling aqua-ammonia pump; packing, gaskets and supplies.

Air. The Use of Cold Air as a Refrigerating Agent, M. Leblanc. Refrig. Eng., vol. 10, no. 8, Feb. 1924, pp. 309–313, 3 figs. Application to freezing of ice; decided departure from beaten path described and advantages of such a system enumerated and backed up with figures. From Revue Générale du Froid, Dec. 1922.

Ethyl-Chloride. An Ethyl Chloride Refrigerating Compressor, R. G. Reid. Ice & Cold Storage, vol. 27, no. 311, Feb. 1924, pp. 27–30, 3 figs. The ideal refrigerant; pros and cons of ethyl chloride; describes Peter Brotherhood, Ltd., vertical single-cylinder two-stage uniflow machine.

Modern Types. Modern Refrigerating Machines, R. G. Reid. Inst. Mar. Engrs.—Trans., vol. 35, Feb. 1924, pp. 570–601 and (discussion) 601–607, 6 figs. Shows factors which have influenced adoption of high-speed compressor, describes some particular machines, and presents summary of tests taken from such machines on test bed in actual service.

REFRIGERATION

Absorption System. The Absorption Refrigerating System, H. J. Macintire. Power, vol. 59, no. 11, Mar. 11, 1924, pp. 399–401. Competition of compression system; refrigeration calculations; heat taken up in absorber.

Intermittent System. Intermittent System of Refrigeration, W. F. Schaphorst. Power Plant Eng., vol. 28, no. 6, Mar. 15, 1924, pp. 347–348, 2 figs. Describes refrigerating system which may be operated on off-peak boiler loads.

RESEARCH

Industrial. Industrial Research as a Factor in Progress, A. W. Mellon. Chem. Age (N. Y.), vol. 32, no. 1, Jan. 1924, pp. 15–16. The role of industrial research in iron and steel, and by-product coke industry; coöperation of industry with organized research.

Scientific Work and Research in the Mechanical Industry (Ueber wissenschaftliche Arbeit und Forschung in der Maschinenindustrie), G. Lippart. Zeit. des Vereines deutscher Ingenieure, vol. 68, no. 5, Feb. 2, 1924, pp. 89–93. Discusses field of application of science in industry, and refers to conditions in United States as described by W. Rosenhain; discusses research work in mechanical industry in Germany and suggests ways of improving work of coördination between science and industry.

RIVETS

Cutting with Electric Arc. Rivet Cutting with an Electric Arc. Ry. Rev., vol. 74, no. 7, Feb. 16, 1924, pp. 290–292, 6 figs. Describes equipment in use for burning off of rivets on steel cars and locomotive boilers and tender tanks at Huntington, W. Va., shops of Chesapeake & Ohio Ry.

S

SCRAP

Chip-Handling Plant. What Becomes of the Chips? C. J. Priebe. Am. Mach., vol. 60, no. 10, Mar. 6, 1924, pp. 361–363, 5 figs. Chip house at plant of LeBlond Machine Tool Co., Cincinnati; how chips are handled on production basis to facilitate shipment; plant for separating and filtering oil.

SCREW THREADS

Stud Fitting. Modern Practice in Fitting Studs. Am. Mach., vol. 60, no. 9, Feb. 28, 1924, pp. 323–324. Résumé of methods used in securing satisfactory fits for studs in aluminum, bronze, cast iron and steel.

SEAPLANES

Static Stability. Static Stability of Seaplane Floats and Hulls, W. S. Diehl. Nat. Advisory Committee for Aeronautics—Tech. Notes, no. 183, Mar. 1924, 13 pp., 3 figs. Lateral stability—twin floats; longitudinal stability—single and twin floats; lateral stability—single float and boat-type seaplanes; application to design.

STANDARDIZATION

Methods. Contribution to Methods of Standardization (Beschowingen over Normalisatie-methodiek), J. Goudriaan, Jr. Ingenieur, vol. 39, no. 3, Jan. 19, 1924, pp. 33–38, 6 figs. Theoretical investigation of most economical steps between successive sizes in series of standardized units. For practical reasons larger steps may be preferable.

STANDARDS

German N. D. I. Reports. Report of the German Industrial Standards Committee (Normenausschuss der Deutschen Industrie). Maschinenbau (NDI-Mitteilungen), vol. 24, no. 8, Jan. 24, 1924, pp. N43-N48, 1 fig. Proposed standard for tangential grooves; reports on transmission, standardization in boiler design, fits, cutting tools, screws, etc.

Report of the German Industrial Standards Committee (NDI-Mitteilungen). Maschinenbau, vol. 3, no. 9, Feb. 14, 1924, pp. 261–268, 5 figs. Proposed standard for rough and semi-finished hexagonal nuts. Changes in standard sheets. Reports of committees on testing methods, iron and steel, railway building materials, bar and section iron, plates and tubes, forged steel, and gears.

STEAM

High-Pressure. Properties and Utilization of High- and Maximum-Pressure Steam (Eigenschaften und Verwertung von Hoch- und Höchstdruckdampf), E. Josse. Zeit. des Vereines deutscher Ingenieure, vol. 68, no. 4, Jan. 26, 1924, pp. 65–71, 20 figs. Properties of steam; treatment of maximum-pressure steam in reciprocating engines (Borsig) and steam turbines (de Laval, Brown-Boveri & Cie, Erste Brünner); feedwater heating through tapping steam; utilization of excess flue-gas heat.

Maximum-Pressure. The Technical and Economic Prospects of Maximum-Pressure Steam (Die technischen und wirtschaftlichen Aussichten von Höchstdruckdampf), F. Münzinger. Zeit. des Vereines deutscher Ingenieure, vol. 68, no. 7, Feb. 16, 1924, pp. 137–146, 16 figs. Calculation of heating surfaces of boiler, superheater and economizer; generation of maximum-pressure steam; behavior of maximum-pressure boilers in operation; dependence of boiler feedwater on steam pressure; new heat-economic problems.

Volcanic, Utilization of. The Utilisation of Volcanic Steam in Italy. Nature (Lond.), vol. 113, no. 2828, Jan. 12, 1924, pp. 54–55, 3 figs. Efforts made in Italy to utilize natural steam which emerges from earth in volcanic districts for production of power.

STEAM ENGINES

Heat Economy in. Heat Economy in Reciprocating Steam Engines (Wärmewirtschaft in der Kolbendampfmaschine), A. Christ. Praktischer Maschinen-Konstrukteur, vol. 57, no. 5, Feb. 5, 1924, pp. 31–33, 2 figs. Supplementary to first part of article published in no. 48–49, 1923, further tests and improvements are described.

STEAM POWER PLANTS

Auxiliary Power Layouts. Energy Supply for Station Auxiliaries, F. M. Billheimer. Elec. World, vol. 83, no. 8, Feb. 23, 1924, pp. 377–380, 10 figs. Reliable service under all operating conditions sought; effect of heat balance and bleeding on layouts; discussion of systems proposed and used.

Detroit Lubricator Co. Power Plant of the Detroit Lubricator Company, C. K. Little. Power, vol. 59, no. 9, Feb. 26, 1924, pp. 316–321, 6 figs. New plant has two bent-tube boilers of 2360 sq. ft. of heating surface each which are on second floor of building, with inside coal storage directly above stokers; details of cooling-water supply; cost of machinery.

Montaup Elec. Co., Mass. Cost Estimate of Montaup Plant Initial Development. Elec. World, vol. 83, no. 10, Mar. 8, 1924, pp. 475–476, 1 fig. One 30,000-kw. unit and three 1500-hp., 400-lb. boilers' giving temperature of 700 deg. fahr., constitute first step.

Salt-Manufacturing Plant. Salt Manufacturer Installs 3625 Kw. Power Plant Eng., vol. 28, no. 6, Mar. 15, 1924, pp. 317–322, 12 figs. New power plant of Ruggles & Rademaker for furnishing electricity, high and low pressure steam and compressed air; boilers are set singly; conveyor controls are interconnected.

Steam Costs. Comparative Analysis of Steam Costs, C. J. Mason. Nat. Engr., vol. 28, no. 3, Mar. 1924, pp. 108–109, 1 fig. How to determine whether privately generated or purchased steam is more economical.

STEAM TURBINES

Lubrication. Correct Lubrication for the Steam Turbine, C. C. Brown. Power Plant Eng., vol. 28, no. 6, Mar. 15, 1924, pp. 323–325. Operating methods, causes for breaking down of oil and specifications for suitable oils are discussed.

Pressure and Velocity. Relation of Pressure and Velocity in Various Types of Steam Turbines, F. P. Hodgkinson. Power, vol. 59, no. 12, Mar. 18, 1924, pp. 444–445, 3 figs. Describes variation in steam pressures and velocity for various types of turbine stages.

STEEL

Chrome-Nickel. See CHROME-NICKEL STEEL.

Corrosion, Natural Water. The Natural Water Corrosion of Steel in Contact with Copper, W. G. Whitman and R. P. Russell. Indus. & Eng. Chem., vol. 16, no. 3, Mar. 1924, pp. 276–279, 1 fig. Experiments wherein natural-water corrosion of steel in contact with metal lower in electromotive series has been quantitatively determined; emphasizes importance of these quantitative data in deciding as to mechanism of corrosion of steel from both theoretical and practical viewpoints.

Grain Growth. An Occurrence of Grain Growth in Steel, A. A. Blue. Iron Age, vol. 113, no. 10, Mar. 6, 1924, pp. 716–718, 9 figs. Carbonizing under certain conditions weakens steel; carbon shell causes internal pressure and weak ferrite bands.

Tool. See TOOL STEEL.

STEEL CASTINGS

Carbon Vanadium. Carbon and Carbon-Vanadium Steel Castings—A Comparison, J. M. Lessells. Am. Soc. Steel Treating—Trans., vol. 5, no. 2, Feb. 1924, pp. 144–152 and (discussion) 152–157, 7 figs. Physical properties of carbon and carbon-vanadium steel castings as obtained from coupon test pieces in cast, annealed and normalized conditions; evidence is given to show that addition of vanadium as alloying element greatly improves quality of material.

STEEL, HEAT TREATMENT OF

Hardening, Selective. A Shop Talk on Selective Hardening Methods. Can. Machy., vol. 31, no. 9, Feb. 28, 1924, pp. 23 and 36, 2 figs. Discusses methods available, viz., selective quenching, selective heating, and selective surface exposure.

Nickel-Steel Carburization. Heat-treatment of Steel with Special Reference to Production, J. W. Urquhart. Machy. (Lond.), vol. 23, no. 595, Feb. 21, 1924, pp. 681–684, 4 figs. Carburization of nickel steels.

STEEL MANUFACTURE

Basic Steel, Metal-Mixer Practice for. Metal Mixer Practice and Basic Steel Making, T. P. Colclough. Chem. Age (Lond.), vol. 10, no. 246, Mar. 1, 1924, pp. 18–19. Advantages derived from use of mixer. Used as preliminary refining furnaces, limestone, and oxide of iron, in form of iron ore or tap cinder, being charged as required, and in this way a large proportion of impurities is removed; effects of this purification of pig iron on operation of open-hearth furnaces.

High-Quality Steel. Fundamentals Essential to Improved Quality Steel Production, Em. Gathmann. Am. Soc. Steel Treating—Trans., vol. 5, no. 2, Feb. 1924, pp. 158–168, 4 figs. Fundamentals essential to high-quality steel production and certain improved ingot molds and appliances, whereby tonnage production of sound steel has been made possible and practicable; in author's belief, one of fundamentals is use of big-end-up or inverted pyramidal ingot, in combination with other fundamental practice as described in detail.

Open-Hearth-Furnace. Absorption of Sulfur from Producer Gas in Open-hearth Furnaces, J. H. Nead. Am. Inst. Min. & Met. Engrs.—Trans., No. 1298-S, Feb. 1924, 10 pp., 2 figs. Results obtained from two Armco ingot-iron heats; absorption occurs during melting-down stage.

Rate of Cooling in Ingot Molds. Effect on Steel of Variations in Rate of Cooling in Ingot Molds, W. J. Priestley. Am. Inst. Min. & Met. Engrs.—Trans., no. 1236-S, Feb. 1924, 56 pp., 49 figs. Shows, by practical experiments, how rate of cooling steel in mold governs ingotism, segregation, formation of dendrites and distribution of intergranular material, and resulting effect these conditions have on physical qualities of steel before annealing, after annealing, and after forging. How structure of steel is effected by design of mold and method of pouring.

STEEL WORKS

Granite City, Ill. Expanding from Kitchen Ware to Ingots, G. L. Lacher. Iron Age, vol. 113, no. 11, Mar. 13, 1924, pp. 773–778, 8 figs. Latest additions to Granite City Works of Nat. Enameling & Stamping Co. include plate mill, regenerative-type slab-heating furnace and large sheet plant.

STOKERS

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Alphabetical List on page 174

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*Catalogue data of firms marked * appear in the A.S.M.E. Condensed Catalogues of Mechanical Equipment, 1923-24 Volume*

Works, and Why, Jos. G. Worker. Coal Age, vol. 25, no. 10, Mar. 6, 1924, pp. 347–349, 5 figs. Number of underfeed stokers has increased rapidly; what special features in design have been introduced for burning Western coals; progress of ash in fire must be given serious consideration. (Abstract.) Paper read before Chicago Section, A.S.M.E.

Underfeed Stokers, J. G. Worker. Refrig. Eng., vol. 10, no. 8, Feb. 1924, pp. 295–304 and (discussion) 304–305 and 309, 21 figs. Description of some types (both multiple- and single-retort) now being used in United States; performance and coal conditions; height to set boilers.

STREET RAILWAYS

Carhouses. Carhouse for 100 Cars at Louisville, F. H. Miller. Elec. Ry. Jl., vol. 63, no. 11, Mar. 15, 1924, pp. 403–406, 10 figs. Describes new structure, which replaces carhouse burned last year, of reinforced concrete with full sprinkler equipment; through tracks facilitate car movement; novel type of double skeleton pits and facilities for car washing.

Cars. Brooklyn's "Duplex Car" Placed in Service. Elec. Ry. Jl., vol. 63, no. 7, Feb. 16, 1924, pp. 252–255, 8 figs. Two-unit, three-truck car, 63 ft. 10 in. overall, built by Brooklyn-Manhattan Transit Corp.; has novel center construction with weather-tight drum to permit free passage between the two sections.

One-Man Cars in Holland, P. M. Nieuwenhuis. Elec. Ry. & Tramway Jl., vol. 50, no. 1223, Feb. 8, 1924, pp. 71–74, 3 figs. Experiences and results at Arnhem.

Three-Car Articulated Train. Three-Car Articulated Train for Detroit, A. C. Colby. Elec. Ry. Jl., vol. 63, no. 10, Mar. 8, 1924, pp. 357–362, 12 figs. Articulated construction reduces weight and cost and also gives improved riding qualities; seating capacity is 140 passengers; many unusual features of design.

Track Reconstruction. Reconstructing Track For $7.72 Per Lineal Foot. Elec. Traction, vol. 20, no. 2, Feb. 1924, pp. 85–87, 6 figs. How Oklahoma Ry. Co. reconstructed 3500 ft. of double track at low cost; modern methods employed.

SUPERPOWER

Isolated Station vs. Superpower vs. Coal Conservation, E. Douglas. Power, vol. 59, no. 12, Mar. 18, 1924, pp. 448–449. Points out that panacea of all troubles does not lie with superpower, nor will isolated plant be best solution in all cases, but a combination of the two with proper consideration given to both power and heating, as well as use of steam for industrial purposes, will be intelligent solution. (Abstract.) Paper read before Wis. Eng. Soc.

Significance of. Super Power, S. O. Hayes. Indus. Mgt. (N. Y.), vol. 67, no. 3, Mar. 1924, pp. 136–138. What it means and what it will accomplish.

T

TERMINALS, LOCOMOTIVE

Peach Creek, W. Va. New Engine Terminal at Peach Creek, W. Va. Ry. Rev., vol. 74, no. 7, Feb. 16, 1924, pp. 279–286, 15 figs. partly on p. 287. Describes engine house, boiler plant and engine room, machine shop, oil room, store-department facilities, coaling plant, and water-supply plant and its equipment.

Richmond, Va. Advanced Design in New Engine Terminal. Ry. Age, vol. 76, no. 9, Mar. 1, 1924, pp. 492–499, 17 figs. Layout, outside facilities and buildings of terminal recently completed at Richmond, Va. by R. F. & P. See also Ry. Rev., vol. 74, no. 10, Mar. 8, 1924, pp. 399–412, 32 figs.

TERMINALS, RAILWAY

Passenger. Progress on the Chicago Union Station. Ry. Rev., vol. 74, no. 10, Mar. 8, 1924, pp. 416–422, 10 figs. Description of important passenger tunnel; will be in service late in 1924 and will be completed in 1925.

Ports. Study of a Large Terminal Develops Basic Data, J. R. Bibbins. Ry. Age, vol. 76, no. 8, Feb. 23, 1924, pp. 463–465, 2 figs. Origin-destination survey made at New Orleans may be applied to other large railway centers.

Train Shed, Cologne, Germany. The Train Shed of the Cologne-Deutz Railway Station (Die Bahnhofshalle von Cöln-Deutz), M. Foerster. Bauingenieur, vol. 5, no. 3, Feb. 15, 1924, pp. 43–55, 26 figs. Three-sectional shed has middle span of 27.50 m. and side spans of 18.72 m. each; whole system is statically determined and consists of three 3-hinged arches.

TESTS AND TESTING

Shop Methods. Test Methods for the Shop, D. A. Hampson. Am. Mach., vol. 60, no. 9, Feb. 28, 1924, pp. 325–328, 7 figs. Usual shop tests; use of revolution counter, spring balance, platform scale and Bourdon gage; checking instruments.

TEXTILE MILLS

Electric Drive. Electricity in Textile Mills. Electrician, vol. 92, no. 2389, Feb. 29, 1924, pp. 252–260, 17 figs. Six articles, discussing advantages of electric drive for textile mills, use of electricity for driving flax spinning mills, selecting motors for cotton mills, replacing steam with electric drive without cessation of production in carpet mill, special points in converting equipment to electric drive in fabric-printing works, and a Swiss spinning mill fitted with Oerlikon drives.

TIRES, RUBBER

Molds and Forms for. How Automobile Tire Molds Are Made, Chas. O. Herb. Machy. (N. Y.), vol. 30, no. 7, Mar. 1924, pp. 497–500, 9 figs. Turning and boring mold and form, and engraving tread design in mold.

TOOL STEEL

Time and Temperature, Effects of. The Effects of Time and Temperature on Certain Special Steels, W. E. Woodward. West of Scotland Iron & Steel Inst.—Jl., vol. 31, part 2, Nov., Session 1923–24, pp. 32–34 and (discussion) 35–39, 23 figs. on supp. plates. Describes work undertaken to see if some modern steels said to be suitable for high-speed steel tools would exhibit some phenomena which might afford clue as to their reputed properties; use of Landon dilatometer for measuring expansion and contraction of moderately sized specimens.

TOOLS

Cutter Heads. A New Cutter Head for Locomotive Shops (Ein neuer Messerkopf für Lokomotiv-Werkstätten), Trautvetter. Glasers Annalen, vol. 94, no. 2, Jan. 15, 1924, pp. 21–23, 5 figs. Describes new Triplex cutter block for drilling holes in smoke and water tubes.

Flexible Shaft Driven. Power Tools with Flexible-Shaft Drive (Kraftwerkzeuge mit Drahtwellenantrieb), W. Schwarz. Maschinenbau, vol. 3, no. 9, Feb. 14, 1924, pp. 237–240, 9 figs. Points out advantages of power transmission by means of a flexible wire shaft.

Pattern Work and Drafting. Tool Engineering, A. A. Dowd. Am. Mach., vol. 60, nos. 11 and 12, Mar. 13 and 20, 1924, pp. 407–409 and 443–445, 8 figs. Mar. 13: Points on pattern work for tool designer; use of cores and loose pieces; importance of fillets. Mar. 20: Organization of tool-drafting department; method of keeping record of drawings.

Stellite. Recent Results Obtained with Stellite Tools (Neue Ergebnisse mit Stellitwerkzeugen), H. Märkle. Maschinenbau, vol. 3, no. 9, Feb. 14, 1924, pp. 235–237. Favorable results of recent tests.

TRACTORS

Farm, Specifications for. British and American Agricultural Tractor Sperifications. Automotive Industries, vol. 50, no. 8, Feb. 21, 1924, pp. 453–457. Tabular data.

TUBES

Heat Dissipation from Surfaces. Heat Dissipation from the Surfaces of Pipes and Cylinders in an Air Current, A. H. Gibson. Lond., Edinburgh, & Dublin Philosophical Mag. & Jl. Sci., vol. 47, no. 278, Feb. 1924, pp. 324–336, 4 figs. Experiments carried out with view of obtaining data as to rate of heat dissipation from tubular metal surfaces adaptable as oil coolers for aircraft.

Secondary Failure. On the Secondary Failure of Thin Tubes of Circular Section subjected to Terminal Couples, M. S. Ahmed. Lond., Edinburgh, & Dublin Philosophical Mag. & Jl. Sci., vol. 47, no. 278, Feb. 1924, pp. 319–323, 3 figs. Investigation to determine under what conditions secondary stresses due to deformation of cross-section into oval shape exceed primary stresses found on ordinary theory of pure bending.

V

VALVE GEARS

Transmission Effects. Transmission Effects of a Multiple-Link Valve Gear (Uebersetzungswirkungen eines mehrgliedrigen Getriebes), R. Doerfel. Maschinenbau, vol. 3, no. 8, Jan. 24, 1924, pp. 193–197, 9 figs. Investigation of admission valve gear of uniflow engine and determination of dimensions of valve-gear rods.

VALVES

Superheated-Steam and High-Pressure. Modern Superheated-Steam and High-Pressure Valves (Neuere Heissdampf- und Hochdruckschieber), G. W. Koehler. Zeit. des Vereines deutscher Ingenieure, vol. 68, no. 5, Feb. 2, 1924, pp. 95–100, 22 figs. Deals with valves with simple and with two parallel seats and emphasizes advantage of auxiliary valve, which is automatically set in action by tightening of valve stem; deals also with flap valves, and their advantages.

VIBRATIONS

Machinery, Isolation of. The Isolation of Machinery Vibration and Noise. Machy. Market, no. 1214, Feb. 8, 1924, pp. 23–24, 2 figs. Describes effect of patent anti-vibration devices and "Coresil" foundation plates.

Mechanical. The Vibration Problem in Engineering, R. Soderberg. Elec. Jl., vol. 21, nos. 1, 2 and 3, Jan., Feb. and Mar., 1924, pp. 39–43, 53–55 and 89–97, 21 figs. Fundamental facts underlying problem of vibration, its general effects and methods usually employed in preventing and curing vibration troubles; review of theory; mechanical balancing.

W

WATER POWER

Economic Utilization, Switzerland. The Consumption of Energy from Hydroelectric Plants in Switzerland and the Utilization of Water-Power Sources (Ueber die Verhältnisse des Energieabsatzes aus den hydroelektrischen Werken in der Schwiez, etc.), W. Wyssling. Schweiz. Elektrotechnischer Verein—Bul., vol. 15, no. 1, Jan. 1924, pp. 1–28, 8 figs. Discusses characteristics of Swiss water powers and investigates variations in power demand according to hour and season, showing by numerous figures and diagrams to what extent it is possible to influence this variation and thus improve possibilities of power utilization; discusses export of surplus energy, and draws conclusions for design of hydroelectric plants.

WATER TREATMENT

Softening. Water-Softening by Means of Doucil, T. P. Hilditch and H. J. Wheaten. Engineering, vol. 117, no. 3035, Feb. 29, 1924, pp. 287–288. Describes comparatively new base-exchange material manufactured under name of doucil. Paper read before joint meeting of Instn. Mech. Engrs. and Soc. Chem. Industry.

Water Purification for Industrial Purposes, J. P. O'Callaghan. Engineering, vol. 117, no. 3035, Feb. 29, 1924, pp. 286–287. Sedimentation and filtration of water; softening by lime-soda process, and by permutit-zeolite process. Paper read before joint meeting of Instn. Mech. Engrs. and Soc. Chem. Industry.

WELDING

Cast Iron. See CAST IRON, WELDING.

Chemical Aspects. Some Chemical Aspects of Welding, J. R. Booer. Engineering, vol. 117, no. 3033, Feb. 15, 1925, pp. 221–223, 2 figs. Theory and practice in ferrous and non-ferrous work; problems in oxidation and reduction. Paper read before Instn. Welding Engrs. See also Chem. Trade Jl. & Chem. Engr., vol. 74, no. 1917, Feb. 15, 1924, pp. 189–191; and Chem. Age (Lond.), vol. 10, no. 244, Feb. 16, 1924, pp. 164–165.

Electric. See ELECTRIC WELDING; ELECTRIC WELDING, ARC.

Oxy-Acetylene. See OXY-ACETYLENE WELDING.

WELDS

Welded Joint Testing. A Cheap, Reliable and Exhaustive Method of Testing Welded Joints, A. Menetrier. Am. Welding Soc.—Jl., vol. 3, no. 1, Jan. 1924, pp. 13–17, 6 figs. Results of series of shock bending tests which have proved of great value for investigation of relative strength of mild steel-welded joints performed with three different types of electrodes.

WIND

Conditions, Study of. Study of Wind Conditions (Die Erforschung der Windverhältnisse), M. Rosenmüller. Zeit. des Vereines deutscher Ingenieure, vol. 68, no. 8, Feb. 23, 1924, pp. 177–179, 5 figs. Study of constancy of wind based on meteorological data; suggestions for seeking good exposures; choice of favorable site for erection of wind motor and the requisite measuring instruments.

German Statistics. Critical Notes on Wind Statistics in Germany and the Study of Weather from a Technical Standpoint (Kritische Bemerkungen zur Windstatistik in Deutschland und zur Kenntnis vom Wetter bei Technikern), C. Kassner. Zeit. des Vereines deutscher Ingenieure, vol. 68, no. 8, Feb. 23, 1924, pp. 179–180. Deals with numerous relations between meteorology and technology and points out that weather statistics should not be employed without some knowledge of meteorology.

WIND MOTORS

Design. Wind Power (Windkraft), P. v. d. Sterr. Zeit. des Vereines deutscher Ingenieure, vol. 68, no. 5, Feb. 2, 1924, pp. 106–108, 7 figs. Method is suggested of calculating coefficient of variability; attention is called to fact that efficiency of most important parts of wind-motor installation plays an entirely different role than is otherwise the case, and other types of machinery are required.

WIND TUNNELS

Toronto, Canada. Aeronautical Research. Can. Engr., vol. 46, no. 8, Feb. 19, 1924, pp. 255–256, 2 figs. Describes wind channel opened in Aerodynamics Laboratory, Univ. of Toronto, for testing airplane models; first plant in Canada.

WINDMILLS

Burne System. Wind-driven Electrical and Other Installations. Engineer, vol. 137, no. 3560, Mar. 21, 1924, p. 318, 2 figs. Describes new type of windmill which is radical departure from wind-wheel type; chief improvements are found in governing system and construction of sails; designed by E. L. Burne.

WIRE ROPE

Testing. Testing Wires and Wire Ropes, R. G. Batson. Testing, vol. 1, no. 1, Jan. 1924, pp. 7–22, 6 figs. Notes on fatigue testing and fatigue tests on stranded cables, results are given in tabular form.

WOOD

Testing Machine for. A Universal Static and Kinetic Wood Testing Machine, Developed to Meet the Requirements of the French Aeronautical Standardization Committee, B. C. Anderson. Testing, vol. 1, no. 1, Jan. 1924, pp. 72–79, 7 figs. New machine is used first for static tests of wood in bending, in compression, in tension, by splitting and for hardness, and secondly, for carrying out kinetic tests in transverse shock application.

WOODWORKING MACHINES

Mortising and Boring Machine. Wood-Working Mortising and Boring Machine. Engineering, vol. 117, no. 3035, Feb. 29, 1924, pp. 268–269, 3 figs. Describes combined chain and hollow-chisel machine for mortising which can also be used for boring, made by Wadkin & Co., Leicester, England.

Alphabetical List of Advertisers

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THE ENGINEERING INDEX

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(See also page 374 of this issue for supplementary items.)

ABRASIVES

Industrial Diamonds. How Industrial Diamonds Are Set, F. B. Wade. Abrasive Industry, vol. 5, no. 4, Apr. 1924, pp. 93–94. Properties of diamonds for wheel truing, and setting methods.

AIR COMPRESSORS

Impurities in Intake. Keeping Solid Impurities Out of the Air-Compressor Intake, Wm. V. Fitzgerald. Power, vol. 59, no. 16, Apr. 15, 1924, pp. 599–600, 1 fig. Points out that in analyzing troubles in air-compressor operation, single cause for all is frequently found, namely, impurities in intake air.

Piston. Chart for Graphic Determination of Main Dimensions and Data of Piston Compressors (Rechentafel zur graphischen Ermittlung der Hauptabmessungen und -daten von Kolbenkompressoren), H. Heinssen. Maschinenbau, vol. 3, no. 11, Mar. 13, 1924, pp. 364–366, 1 fig. Chart for graphic determination of piston strokes and average piston speeds of piston compressors with given suction performance, r.p.m., and cylinder conditions (relation of cylinder diam. to piston stroke).

Semi-Portable. Semi-Portable Air Compressing and Pumping Sets. Engineering, vol. 117, no. 3040, Apr. 4, 1924, pp. 432–433, 6 figs. Describes self-contained air-compressing unit supplied by Parsons Co., with standard Parsons 3-cylinder engine; and single-cylinder paraffin engine for driving centrifugal pump, whole forming semi-portable pumping unit.

AIR CONDITIONING

Theaters. Downward-Diffusion Air Conditioning System for a Large Theater. Heat. & Vent. Mag., vol. 21, no. 3, Mar. 1924, pp. 57–58, 16 figs. partly on pp. 64–65. How Grauman's Metropolitan Theater, Los Angeles, Cal., is heated, humidified and ventilated in winter and cooled in summer.

AIRCRAFT CONSTRUCTION MATERIALS

Fabrics. Testing Airplane Fabrics, A. Pröll. Nat. Advisory Committee for Aeronautics—Tech. Notes, no. 186, Apr. 1924, 33 pp., 8 figs. Air pressure and tensions in fabric; requirements for fabric; determination of initial tension; interpretation of experiments with stretching frame; curves facilitating calculation of tensions and initial tensions; application of experiments on frames to investigation of wings; calculation for dropped-ball test. Translated from Technische Berichte, vol. 3, no. 7.

AIRPLANE ENGINES

Compression Ignition. The Influence of Inlet Air Temperature and Jacket Water Temperature on Initiating Combustion in a High Speed Compression Ignition Engine, R. Matthews and A. W. Gardiner. Nat. Advisory Committee for Aeronautics—Tech. Notes, no. 185, Mar. 1924, 12 pp., 7 figs. Deals with some tests to determine influence on initiating combustion in one-cylinder compression ignition engine of (1) inlet air temperature, and (2) jacket water temperature.

Developments and Tendencies. The Airplane Engine: Actual Achievements and Tendencies (Le moteur d' aviation: résultats acquis et tendances actuelles), G. Lehr. Aéronautique (Aerotechnique), vol. 6, no. 56, Jan. 1924, pp. 3–10, 13 figs. Problems involved in improvement of design.

Existing, for Commercial Airplanes. The Use of Existing Engines on Commercial Planes (L'Utilisation des Moteurs d'Aviation existant sur les appareils civils). Aérophile, vol. 31, no. 23–24, Dec. 1–15, 1923, pp. 361–365, 4 figs. It is shown that by reducing torque, i.e., mean effective pressure, 10 per cent, life of engine is doubled; it is therefore concluded that existing military engines could be used with profit in commercial planes, provided they are not driven to maximum speeds and torques of which they may be capable. See also abstract in Génie Civil, vol. 84, no. 5, Feb. 2, 1924, p. 119.

Rolls-Royce Condor III. The Rolls-Royce Condor III Aero Engine, W. H. Sayers. Aeroplane, vol. 26, no. 11, Mar. 12, 1924, pp. 222, 224, 226 and 228–229, 12 figs. Description of a 12-cylinder engine developing a normal b.hp. of 650 at 1900 r.p.m.

Salmson. Salmson Aviation Engines (Les Moteurs d'aviation Salmson). Aérophile, vol. 32, no. 1–2, Jan. 1–15, 1924, pp. 33–34, 2 figs. Describes different types of air- and water-cooled engines constructed by firm of Salmson.

Storage Preparations. Comparison Tests of Storage Preparations for Aviation Engine Storage of Less that Six Months, S. A. Christiansen. Air Service Information Circular, vol. 5, no. 451, Mar. 1, 1924, 9 pp., 15 figs. Test to investigate methods and make recommendations.

AIRPLANE PROPELLERS

Adaptability to Airplanes. A Graphic Method for Determining Adaptability of Propellers to Airplanes (Méthode graphique pour l'adaptation des hélices aux avions), G. Delanghe. Génie Civil, vol. 84, no. 8, Feb. 23, 1924, pp. 185–187, 1 fig. Discusses elements of propellers, and develops method for determining, under given conditions, propeller with which maximum speed can be obtained with given course and altitude.

Slipstream Obstructions. The Effect of Slipstream Obstructions on Air Propellers, E. P. Lesley and B. M. Woods. Nat. Advisory Committee for Aeronautics—Report, no. 177, 1924, 24 pp., 15 figs. Results of investigation show that combined efficiency of propeller with any obstruction in slipstream is less than that of propeller free and unobstructed.

AIRPLANES

Airfoils. Aerodynamic Characteristics of Airfoils. Nat. Advisory Committee for Aeronautics—Report, no. 182, 1924, pp. 145–186, 132 figs. Continuation of reports on airfoil data.

Design. The Construction of Airplanes in France and other Countries (La construction des avions en France et à l'Etranger), P. Grimault. Aéronautique, vol. 5, no. 55, Dec. 1923, pp. 509–516, 11 figs. Policy in France, Great Britain, United States and Germany; commercial planes; high-speed planes; military monoplanes and biplanes; medium and large planes.

Flexible Wings. Study of Bird Wings and Flexible Planes (Sur l'étude aérodynamique des ailes d'oiseaux, et des voilures souples), E. Huguenard, A. Magnan and A. Planiol. Académie des Sciences—Comptes Rendus, vol. 178, no. 2, Jan. 7, 1924, pp. 193–196, 2 figs. Describes experimental arrangement used to measure lift-drift ratio, etc., of supple wings. See abstract in Génie Civil, vol. 84, no. 4, Jan. 26, 1924, pp. 91–92, 2 figs.

Fokker. The Fokker C4 Commercial Airplane. Aviation, vol. 16, no. 12, Mar. 24, 1924, p. 310, 1 fig. Adaptation of 2-seater corps observation plane; equipped with 400-hp. Liberty engine.

Gliders. A New Type of Glider (Ein neuartiges "Segel"-Flugzeug), R. Platz. Zeit. für Flugtechnik u. Motorluftschiffahrt, vol. 15, no. 1–2, Jan. 26, 1924, pp. 1–2, 5 figs. Also (translation) Flight, vol 16, no. 10, Mar. 6, 1924, pp. 129–130, 4 figs. Describes design developed by author, which combines advantages of low cost of production, collapsibility so that it can be carried in railway passenger car, easy and cheap changeability of parts, and light weight so that it can be carried by one man, and can be put together in 10 min.; results of tests with models and with full-size plane.

High-Speed, Development of. The Development of High-Speed Aircraft, R. Mayo. Roy. Aeronautical Soc.—Jl., vol. 28, no. 159, Mar. 1924, pp. 158–182 and (discussion) 183–188, 9 figs. Early development; Gnome engines; French ascendancy and British awakening; British research period; war period; revival of rotary engine; postwar period; beginning of American supremacy; French and British post-war efforts; high-speed seaplanes and flying boats; future prospects; value of speed races.

Light. Tendencies of Light-Airplane Construction (Richtlinien des Leichtmaschinenbaus), A. Baumann. Zeit. für Flugtechnik u. Motorluftschiffahrt, vol. 15, no. 3–4, Feb. 26, 1924, pp. 17–19. Discusses factors and problems underlying development of light planes. See also articles entitled The Nature of Light-Airplane Construction (Das Wesen des Leichtbaues), Geo. König, p. 20; and Light-Airplane Construction and Its Future Development (Der Leichtbau und seine Fortentwicklung), H. Seehase, pp. 20–22, 7 figs.

Lioré-Olivier. The New Lioré-Olivier Airplanes and Hydroplanes (Les noveaux Avions et Hydravions Lioré-Olivier). Aérophile, vol. 32, no. 1–2, Jan. 1–15, 1924, pp. 35–37, 3 figs. Details of 3-seater bomber, 2-seater pursuit and night-observation plane, and commercial and military hydroplanes.

Longitudinal Oscillation. Longitudinal Oscillation of an Airplane, R. Fuchs and L. Hopf. Nat. Advisory Committee for Aeronautics—Tech. Notes, no. 188, Apr. 1924, 45 pp., 10 figs. Problem and method of analysis of longitudinal oscillation. Translated from Technische Berichte, vol. 3, no. 7.

Rolling Moment Due to Ailerons. The Induction Factor Used for Computing the Rolling Moment Due to the Ailerons, M. M. Munk. Nat. Advisory Committee for Aeronautics—Tech. Notes, no. 187, Apr. 1924, 5 pp., 1 fig. Induction factor is determined from result of model test, and compared with formula recently developed by author; the two results are found to be in substantial agreement.

P. 5. The "P. 5" or Phoenix "Cork" Flying Boat. Flight, vol. 16, no. 11, Mar 13, 1924, pp. 144–150, 16 figs. Complete description of P. 5 flying boat, having two 360-hp. Rolls-Royce Eagle engines and following dimensions: length 49 ft. 1¾ in., span 85 ft. 6 in., ailerons 81 sq. ft.; and notes on some other products of English Elec. Co., Ltd.

Seaplanes. See SEAPLANES.

Vulture. The Vickers "Vulture" Amphibian Flight, vol. 16, no. 13, Mar. 27, 1924, pp. 172–175, 9 figs. Particulars of flying boat with a Napier "Lion" 450-hp. engine; length 38 ft. 2 in., span 49 ft.; top speed with full load and at sea level about 104 m.p.h., cruising speed about 82 m.p.h.

AIRSHIPS

Semi-Rigid. The Italian "N" Type Semi-Rigid Airship. Flight, vol. 16, no. 12, Mar. 20, 1924, pp. 160–161, 3 figs. Fitted with three 250-hp. engines each located in a stream-lined nacelle built up of duralumin and communicating with interior of keel; capacity 670,700 cu. ft., length 347 ft. 8 in., maximum height 85 ft. 3 in., maximum diameter 64 ft., useful load 10.5 tons, maximum speed 62 m.p.h.

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NOTE.—The abbreviations used in indexing are as follows:

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Association (Assn.)
Bulletin (Bul.)
Bureau (Bur.)
Canadian (Can.)
Chemical or Chemistry (Chem.)
Electrical or Electric (Elec.)
Electrician (Elecn.)
Engineer[s] (Engr.[s])
Engineering (Eng.)
Gazette (Gaz.)
General (Gen.)
Geological (Geol.)
Heating (Heat.)
Industrial (Indus.)
Institute (Inst.)
Institution (Instn.)
International (Int.)
Journal (Jl.)
London (Lond.)
Machinery (Machy.)
Machinist (Mach.)
Magazine (Mag.)
Marine (Mar.)
Materials (Matls.)
Mechanical (Mech.)
Metallurgical (Met.)
Mining (Min.)
Municipal (Mun.)
National (Nat.)
New England (N. E.)
Proceedings (Proc.)
Record (Rec.)
Refrigerating (Refrig.)
Review (Rev.)
Railway (Ry.)
Scientific or Science (Sci.)
Society (Soc.)
State names (Ill., Minn., etc.)
Supplement (Supp.)
Transactions (Trans.)
United States (U. S.)
Ventilating (Vent.)
Western (West.)

Classified List of Mechanical Equipment
Manufactured by Firms Represented in MECHANICAL ENGINEERING

FOR ALPHABETICAL LIST OF ADVERTISERS, SEE PAGE 156

Accumulators, Hydraulic
Farrel Foundry & Machine Co.
Mackintosh-Hemphill Co.
* Worthington Pump & Mchy. Corpn

Aftercoolers, Air
* Ingersoll-Rand Co.

Agitators
Hill Clutch Machine & Fdry. Co.

Air Compressors, Receivers, etc.
(See Compressors, Receivers, etc., Air)

Air Conditioning Apparatus
* American Blower Co.
* Carrier Engineering Corp'n
* Clarage Fan Co.
* Sturtevant, B. F. Co.

Air-Jet Lifts
* Schutte & Koerting Co.

Air Washers
* American Blower Co.
* Carrier Engineering Corp'n
* Clarage Fan Co.
* Cooling Tower Co. (Inc.)
* Spray Engineering Co.
* Sturtevant, B. F. Co.

Alloys
Driver-Harris Co.

Alloys (Calite)
Calorizing Co.

Ammeters
* Bristol Co.
* General Electric Co.
* Westinghouse Electric & Mfg. Co.

Anemometers
* Taylor Instrument Cos.
Weber, F. Co. (Inc.)

Annealing
* American Metal Treatment Co.
Nuttall, R. D. Co.

Arc Welding Equipment
* Westinghouse Elect. & Mfg. Co.

Arches, Boiler Furnace
* McLeod & Henry Co.
* Titusville Iron Works Co.

Arches, Fire Door
* McLeod & Henry Co.

Arches, Ignition (Flat Suspended)
* Combustion Engineering Corp'n
* McLeod & Henry Co.

Asbestos Products
Carey, Philip Co.
Garlock Packing Co.
Johns-Manville (Inc.)

Ash Lifts, Telescopic
Palmer-Bee Co.

Autoclaves
Farrel Foundry & Machine Co.

Babbitt Metal
* Medart Co.
* Westinghouse Elect. & Mfg. Co.

Ball Bearings, Gages, etc.
(See Bearings, Gages, Ball)

Balls, Brass and Bronze
* Atlas Ball Co.
* Gwilliam Co.

Balls, Steel
* Atlas Ball Co.
* Gwilliam Co.
* New Departure Mfg. Co.
* S K F Industries (Inc.)

Barometers
* American Schaeffer & Budenberg Corp'n
* Taylor Instrument Cos.

Barometers, Mercurial
* Tagliabue, C. J. Mfg. Co.

Bearings, Ball
Fafnir Bearing Co.
* Gwilliam Co.
Marlin-Rockwell Corp'n
* New Departure Mfg. Co.
* Norma Co. of America
* S K F Industries (Inc.)
* Strom Ball Bearing Mfg. Co.

Bearings, Radial Thrust
* New Departure Mfg. Co.

Bearings, Roller
* Gwilliam Co.
* Hyatt Roller Bearing Co.
* Norma Co. of America
* Royersford Fdry. & Mach. Co.
* Timken Roller Bearing Co.

Bearings, Self-Oiling
* Brown, A. & F. Co.
* Doehler Die-Casting Co.
* Falls Clutch & Machinery Co.
Hill Clutch Machine & Fdry. Co.
* Jones, W. A. Fdry. & Mach. Co.
Link-Belt Co.
* Royersford Fdry. & Mach. Co.
* Wood's, T. B. Sons Co.

Bearings, Tapered
* Timken Roller Bearing Co.

Bearings, Thrust
Fafnir Bearing Co.
* General Electric Co.
* Gwilliam Co.
Hill Clutch Machine & Fdry. Co.
* Norma Co. of America
* S K F Industries (Inc.)
* Timken Roller Bearing Co.
* Strom Ball Bearing Mfg. Co.

Belt Dressing
* Dixon, Joseph Crucible Co.
Gandy Belting Co.

Belt Lacing, Steel
* Bristol Co.

Belt Tighteners
* Brown, A. & F. Co.
Hill Clutch Machine & Fdry. Co.
* Jones, W. A. Fdry. & Mach. Co.
Link-Belt Co.
* Medart Co.
* Smidth, F. L. & Co.
* Wood's, T. B. Sons Co.

Belting, Canvas (Stitched)
Gandy Belting Co.
* United States Rubber Co.

Belting, Conveyor
Gandy Belting Co.
* Goodrich, B. F. Rubber Co.
* United States Rubber Co.

Belting, Elevator
Gandy Belting Co.
* Goodrich, B. F. Rubber Co.
* United States Rubber Co.

Belting, Endless
Gandy Belting Co.

Belting Fabric
Gandy Belting Co.

Belting, Leather
American Sole & Belting Leather Tanners (Inc.)

Belting, Rubber
* Goodrich, B. F. Rubber Co.
* United States Rubber Co.

Belting, Waterproof
Gandy Belting Co.

Bending & Straightening Machines
* Long & Allstatter Co.

Bends, Pipe
* Frick Co. (Inc)
* Vogt, Henry Machine Co.

Billets, Steel
* Timken Roller Bearing Co.

Blocks, Tackle
Clyde Iron Work Sales Co.
* Roebling's, John A. Sons Co.

Blowers, Centrifugal
* American Blower Co.
* Clarage Fan Co.
* Coppus Engineering Corp'n
* De Laval Steam Turbine Co.
* General Electric Co.
* Ingersoll-Rand Co.
* Kerr Turbine Co.
* Sturtevant, B. F. Co.
* Westinghouse Electric & Mfg. Co.

Blowers, Fan
* American Blower Co.
* Clarage Fan Co.
* Coppus Engineering Corp'n
* Greek Fuel Economizer Co.
* Sturtevant, B. F. Co.

Blowers, Forge
* American Blower Co.
* Sturtevant, B. F. Co.

Blowers, Pressure
* American Blower Co.
* Clarage Fan Co.
Lammert & Mann Co.
* Sturtevant, B. F. Co.

Blowers, Rotary
Fletcher Works
Lammert & Mann Co.
* Schutte & Koerting Co.
* Sturtevant, B. F. Co.

Blowers, Soot
Diamond Power Specialty Corp'n
* Sturtevant, B. F. Co.

Blowers, Steam Jet
* Schutte & Koerting Co.

Blowers, Turbine
* Coppus Engineering Corp'n
* Sturtevant, B. F. Co.

Blueing (Metal)
* American Metal Treatment Co.

Boards, Drawing
Dietzgen, Eugene Co.
Keuffel & Esser Co.
New York Blue Print Paper Co.
ParVell Laboratories
U. S. Blue Co.
Weber, F. Co. (Inc.)

Boiler Baffles
* King Refractories Co. (Inc.)
* McLeod & Henry Co.

Boiler Compounds
* Dixon, Joseph Crucible Co.
Unisol Mfg. Co.

Boiler Coverings, Furnaces, Tube Cleaners, etc.
(See Coverings, Furnaces, Tube Cleaners, etc., Boiler)

Boiler Fronts
* O'Brien, John Boiler Works Co.
* Titusville Iron Works Co.

Boiler Settings, Steel Cased
* Casey-Hedges Co.
* McLeod & Henry Co.
* O'Brien, John Boiler Works Co.
* Vogt, Henry Machine Co.
* Walsh & Weidner Boiler Co.

Boilers, Heating
* Casey-Hedges Co.
* Erie City Iron Works
* Keeler, E. Co.
* Leffel, James & Co.
Lidgerwood Mfg. Co.
* O'Brien, John Boiler Works Co.
* Titusville Iron Works Co.
* Union Iron Works
* Walsh & Weidner Boiler Co.

Boilers, Locomotive
* Casey-Hedges Co.
* Keeler, E. Co.
* Leffel, James & Co.
* Titusville Iron Works Co.
* Union Iron Works
* Walsh & Weidner Boiler Co.

Boilers, Marine (Scotch)
Bethlehem Shipbldg.Corp'n(Ltd.)
* Casey-Hedges Co.
* Leffel, James & Co.
* Titusville Iron Works Co.
* Walsh & Weidner Boiler Co.

Boilers, Marine (Water Tube)
* Babcock & Wilcox Co.
Bethlehem Shipbldg.Corp'n(Ltd.)
* Casey-Hedges Co.
* Connelly, D. Boiler Co.
* O'Brien, John Boiler Works Co
* Springfield Boiler Co.
* Titusville Iron Works Co.
* Walsh & Weidner Boiler Co.
* Ward, Charles Engineering Wks.

Boilers, Portable
* Casey-Hedges Co.
* Erie City Iron Works
* Frick Co. (Inc.)
* Keeler, E. Co.
* Leffel, James & Co.
Lidgerwood Mfg. Co.
* O'Brien, John Boiler Works Co.
* Titusville Iron Works Co.
* Union Iron Works
* Walsh & Weidner Boiler Co.

Boilers, Tubular (Horizontal Return)
* Bigelow Co.
* Casey-Hedges Co.
* Cole, R. D. Mfg. Co.
* Connelly, D. Boiler Co.
* Erie City Iron Works
* Keeler, E. Co.
* Leffel, James & Co.
Lidgerwood Mfg. Co.
Morrison Boiler Co.
* O'Brien, John Boiler Works Co.
* Titusville Iron Works Co
* Union Iron Works.
* Vogt, Henry Machine Co.
* Walsh & Weidner Boiler Co.
* Ward, Charles Engineering Wks.
* Webster, Howard J.
* Wickes Boiler Co.

Boilers, Tubular (Vertical Fire)
* Bigelow Co.
* Casey-Hedges Co.
Clyde Iron Works Sales Co.
* Keeler, E. Co.
* Leffel, James & Co.
Lidgerwood Mfg. Co.
Morrison Boiler Co.
* O'Brien, John Boiler Works Co.
* Titusville Iron Works Co.
* Union Iron Works
* Walsh & Weidner Boiler Co.

Boilers, Water Tube (Horizontal)
* Babcock & Wilcox Co.
Bethlehem Shipbldg.Corp'n(Ltd.)
* Casey-Hedges Co
* Cole, R. D. Mfg. Co.
* Connelly, D. Boiler Co.
* Edge Moor Iron Co.
* Erie City Iron Works
* Keeler, E. Co.
* Ladd, George T. Co.
Morrison Boiler Co.
* O'Brien, John Boiler Works Co.
* Springfield Boiler Co.
* Union Iron Works
* Vogt, Henry Machine Co.
* Walsh & Weidner Boiler Co.
* Wickes Boiler Co.

Boilers, Water Tube (Inclined)
* Babcock & Wilcox Co.
Bethlehem Shipbldg.Corp'n(Ltd.)
* Bigelow Co.
* Casey-Hedges Co.
* Keeler, E. Co.
* Ladd, George T. Co.
Morrison Boiler Co.
* O'Brien, John Boiler Works Co.
* Vogt, Henry Machine Co.
* Walsh & Weidner Boiler Co.
* Ward, Charles Engineering Wks.

Boilers, Water Tube (Vertical)
* Babcock & Wilcox Co.
* Bigelow Co.
* Casey-Hedges Co.
* Erie City Iron Works
* Keeler, E. Co.
* Ladd, George T. Co.
Morrison Boiler Co.
* O'Brien, John Boiler Works Co.
* Walsh & Weidner Boiler Co.
* Wickes Boiler Co.

Boring and Drilling Machines
Universal Boring Machine Co.

Boring Drilling and Milling Machines (Horizontally Combined)
Universal Boring Machine Co.

Boxes, Carbonizing
Driver-Harris Co.

Boxes, Case Hardening
Driver-Harris Co.

Boxes, Water Service
Murdock Mfg. & Supply Co.

Brake Blocks
Johns-Manville (Inc.)

Brakes, Air
* Allis-Chalmers Mfg. Co.
* General Electric Co.

Brass Goods
* Scovill Mfg. Co.

Brass Mill Machinery
Farrel Foundry & Machine Co.

Breechings, Smoke
Morrison Boiler Co.
* Titusville Iron Works Co.
* Vogt, Henry Machine Co.

Brick, Fire
* Bernitz Furnace Appliance Co.
* Celite Products Co.
* Drake Non-Clinkering Furnace Block Co.
Keystone Refractories Co.
* King Refractories Co. (Inc.)
* McLeod & Henry Co.
Maphite Sales Corp'n

Brick, Insulating
* Celite Products Co.
* Quigley Furnace Specialties Co.

Bridges, Coal & Ore Handling
* Brown Hoisting Machinery Co.
Link-Belt Co.

Bridgewalls (Furnace)
* McLeod & Henry Co.

*Catalogue data of firms marked * appear in the A.S.M.E. Condensed Catalogues of Mechanical Equipment, 1923-24 Volume*

Zeppelin. Largest and Fastest of the Zeppelins. Sci. Am., vol. 130, no. 4, Apr. 1924, pp. 238–239, 7 figs. Particulars of new German-built airship for Navy.

ALLOY STEELS

Copper Steel. Copper in Modern Steels, G. J. Fertig. Tech. Eng. News, vol. 4, nos. 9 and 10, Mar. and April 1924, pp. 352–353 and 378, and 8–9 and 30, 15 figs. Mar.: Details concerning hardness properties of copper steels. Apr.: Corrosion features of these steels.

ALLOYS

Aluminum. See ALUMINUM ALLOYS.

Bearing Metals. See BEARING METALS.

ALUMINUM

Cerium, Influence of. The Influence of Cerium on Aluminum (Der Einfluss des Cers auf Aluminium), K. L. Meissner. Metall u. Erz., vol. 21, no. 3, 1st Feb. issue, 1924, pp. 41–44. Critical discussion of previous investigations; and results of author's own investigations.

ALUMINUM ALLOYS

Quaternary. The Aluminum-Rich Mixed-Crystal Range in Quaternary System Aluminum-Magnesium-Silicon-Zinc (Das aluminiumreiche Mischkristallgebiet im Vierstoffsystem Aluminium-Magnesium-Silizium-Zink). W. Sander and K. L. Meissner. Zeit. für Metallkunde, vol. 16, no. 1, Jan. 1924, pp. 12–17, 9 figs. Based on investigations, authors present their views on process of refining in self-refining aluminum alloys and describe refining phenomena observed in certain aluminum alloys.

Ternary. The Constitution of Ternary Alloys of Aluminum (Ueber die Konstitution von Dreistofflegierungen des Aluminiums), V. Fuss. Zeit. für Metallkunde, vol. 16, no. 1, Jan. 1924, pp. 24–25, 3 figs. Determination of structure of 15 alloys with respect to influence of additional metals on basic aluminum.

Treatment Process. Investigation of the Z-D Process for Treatment of Light Alloys to Inhibit Corrosion, to Minimize Porosity and to Effect Desired Physical Properties, A. C. Zimmerman and S. Daniels. Air Service Information Circular, vol. 5, no. 448, Mar. 1, 1924, 22 pp., 15 figs. Results of investigations show that process prevents corrosion of aluminum and its alloys more effectively and efficiently than any other inorganic coating process, but is not so effective in minimizing porosity as Norton process.

AUTOMOBILE ENGINES

Balancing. Practical Methods of Engine-Balancing, L. L. Roberts. Soc. Automotive Engrs.—Jl., vol. 14, no. 4, Apr. 1924, pp. 452–456, 8 figs. Author divides into three major groups units of automobile that require particular attention and treatment to assure smooth-running mechanism and gives details of actual methods employed by Packard Motor Co. to balance parts that constitute each group.

Carburetors. See CARBURETORS.

Cooling Systems. Engine-Cooling Systems and Radiator Operating Characteristics, N. S. Diamant. Soc. Automotive Engrs.—Jl., vol. 14, no. 4, Apr. 1924, pp. 396–406, 14 figs. Quantitative comparison of air, water and oil-cooled cylinders as it relates to subject of heat transfer and temperature drop; comprehensive discussion of radio-condenser type of cooling is given under headings of steam cooling systems and characteristics, cooling capacity of radiators used to condense steam and present state of development; discussion of performance of operating characteristics of radiators from viewpoint of car, truck or tractor designer.

Eight-in-Line. Excelsior Offers New Eight-in-Line Overhead Valve Engine. Automotive Industries, vol. 50, no. 13, Mar. 27, 1924, pp. 715–717, 4 figs. Product of Chicago concern has nine-bearing crankshaft, aluminum rods and pistons and high-pressure lubricating system; is reported to develop 93 b.hp. at 2500 r.p.m.; bore is 3 3/8 in. and stroke 4 1/2 in.

Heavy-Oil. Oil Engines for Motor Vehicles, with Special Regard to the Bagnulo Engine (Oelmotoren für Kraftfahrzeuge unter besonderer Berücksichtigung des Bagnulo-Motors), L. Hausfelder. Wirtschafts-Motor, vol. 6, no. 2, Feb. 1924, pp. 1–8, 5 figs. Discusses different types of oil engines used in automobiles, and describes Bagnulo engine as example of satisfactory solution of problem of automobile engine for heavy oils.

Manifolds, Distribution in. Intake-Manifold Distribution, H. W. Asire. Soc. Automotive Engrs.—Jl., vol. 14, no. 4, Apr. 1924, pp. 387–395, 22 figs. Investigation to determine following questions: (1) how bad is distribution; (2) how do different types of manifold compare; (3) why is liquid distribution in some manifolds poor; (4) how can trouble be corrected.

Radiators, Honey as Anti-Freeze. Honey as Anti-Freeze for Automobile Radiators, T. P. G. Shaw and G. L. Robertson. Can. Chem. & Metallurgy, vol. 8, no. 3, Mar. 1924, pp. 63–64. Discussion from standpoint of viscosity at low temperatures and crystallization-point angles, giving results of experiments.

Simson. Small High Speed Engine Used in New German Car, B. R. Dierfeld. Automotive Industries, vol. 50, no. 13, Mar. 27, 1924, pp. 726–730, 5 figs. Simson car has 4-wheel brakes, connected diagonally in pairs; 4-cylinder power plant is overhead valve type, carries two camshafts, and has two inlet and two exhaust valves for each cylinder; wheelbase is 118 in.

AUTOMOBILE FUELS

Alcohol-Gasoline Mixtures. Alcohol-Gasoline Mixtures, A. C. Zimmerman. Air Service Information Circular, vol. 5, no. 450, Mar. 1, 1924, 3 pp., 5 figs. Investigation of properties of mixtures of aviation gasoline and 198-proof alcohol which has been denatured with 1 per cent of aviation gasoline.

AUTOMOBILE MANUFACTURING PLANTS

Chevrolet Bodies. Chevrolet Tarrytown Plant Assembles 600 Complete Cars a Day, H. Chase. Automotive Industries, vol. 50, no. 12, Mar. 20, 1924, pp. 666–671, 3 figs. Plant for building, enameling, and trimming all open bodies required; most operations are performed on continuously moving conveyors; tunnel baking ovens employed; maximum temperature held at 350 deg. fahr.

AUTOMOBILES

Air Resistance. The Automobile in Air Current (Das Auto im Luftstrom), E. Rumpler. Zeit. für Flugtechnik u. Motorluftschiffahrt, vol. 15, no. 3–4, Feb. 26, 1924, pp. 22–25, 9 figs. Discusses progress made in recent years in application of airplane theories to automobile design; introduction of streamline automobile developed by author in 1921; results of experiments carried out at Aerodynamic Experimental Station in Göttingen. See also article entitled Air Resistance and High-Speed Automobiles (Luftwiderstand und Schnellkraftwagen), A. Persu, pp. 25–27, 3 figs., discussing future design of streamline automobiles.

Body Finishes. Egyptian Lacquer Develops New Nitrocellulose Automobile Finish, H. Chase. Automotive Industries, vol. 50, no. 15, Apr. 10, 1924, pp. 828–829. Differs from other products in same general class by employing priming, filler and glaze coats which have same pyroxylin base and quick air-drying qualities as final colors; exceptional durability and rapid completion of work among chief claims made.

More Durable Car Finishes Are Making Their Appearance. Automotive Industries, vol. 50, no. 14, Apr. 3, 1924, pp. 777–779, 5 figs. Cellulose nitrate coating is said to last as long as vehicle and retains permanent luster; better undercoats double life of ordinary varnish jobs; black and color enamels, when dulled, are easily restored by rubbing and polishing.

Wood Framed Bodies Finished in High Bake Enamel by New Process, W. L. Carver. Automotive Industries, vol. 50, no. 13, Mar. 27, 1924, pp. 718–720. Special coating, placed on frame prior to enameling, protects wood members from intense heat; commercial use of China wood oil makes possible this method, known as Oxvar system.

Brake-Testing Apparatus. Special Apparatus Tests Rickenbacker Brakes on Assembly Line. Automotive Industries, vol. 50, no. 11, Mar. 13, 1924, pp. 621–623, 2 figs. Rods are adjusted to permanent length which is not altered during road test; equipment involves set of power-operated drums which contact with wheels and elevating mechanism.

Brakes. Automobile Brakes (Le freinage des automobiles). Vie Technique & Industrielle, vol. 6, no. 52, Jan. 1924, pp. 226–234, 12 figs. Notes on problem and difficulties of braking; principles of servo brakes, and advantages of Hallot system of servo brakes; effect of Hallot automatic regulator on automobile brakes; Perrot, Birkigt and Isotta-Fraschini brake systems; control of brakes in Renault automobile.

Difficult Problems Involved in Power Braking for Motor Vehicles, P. M. Heldt. Automotive Industries, vol. 50, no. 12, Mar. 20, 1924, pp. 656–666, 8 figs. Describes Westinghouse air-brake equipment for rail cars and Simplex vacuum brake for passenger cars and trucks; problems involved in design of efficient power-braking systems.

Hydraulic Brake Operation. Autocar, vol. 52, no. 1482, Mar. 14, 1924, pp. 465–467, 6 figs. Consideration of a system, remarkable for its simplicity and efficacy, which was first tried over 12 yrs. ago.

New Hydraulic Brake System. Automotive Industries, vol. 50, no. 11, Mar. 13, 1924, p. 615, 1 fig . New 4-wheel hydraulic-brake system worked out by Mattingly Automatic Valve Co. of St. Louis, claimed to possess advantage that if connection to any of four brake cylinders should break or otherwise become seriously defective, remaining three brakes will not be prevented from functioning.

The Hallot Servo Brakes for Automobiles (Le servo-frein Hallot, pour automobiles). Génie Civil, vol. 84, no. 9, Mar. 1, 1924, pp. 212–213, 2 figs. Discusses action of servo brakes and describes Hallot brake which is one of most widely used of this type.

Chassis Lubrication. Chassis Lubrication, F. H. Gleason. Soc. Automotive Engrs.—Jl., vol. 14, no. 4, Apr. 1924, pp. 422–430 and 445, 12 figs. Classification of means generally employed for chassis lubrication; referring to respective characteristics of grease and of oil, those of oil are summarized and preferred; describes centralized oil-lubrication system, composed of central oil reservoir and pump, main-supply line and delivery tubes; advantages of system.

Charcoal-Producer-Gas-Burning. The Burning of Charcoal Producer Gas in Automobile Engines (L'alimentation des moteurs d'automobiles au gaz pauvre), A. Caputo. Technique Moderne, vol. 16, no. 4, Feb. 15, 1924, pp. 116–118, 8 figs. Describes Berliet system of installing charcoal gas producer in rear of car.

Eric Campbell. The Eric Campbell Cars. Auto-Motor Jl., vol. 29, no. 11, Mar. 13, 1924, pp. 225–228, 13 figs. Description of a light, fast and efficient small vehicle; good road-holding and gallon-mileage properties are features; 4-cylinder monobloc engine; bore 66 mm. and piston stroke 109.5 mm.

G. W. K. The 1924 G. W. K. Car. Auto-Motor Jl., vol. 29, no. 10, Mar. 6, 1924, pp. 203–206, 12 figs. Efficient friction-drive car; 4-cylinder monobloc engine; 10.8 hp., with bore of 66 mm. and piston stroke of 100 mm.

Gwynne "Eight." The Gwynne "Eight." Auto-Motor Jl., vol. 29, no. 13, Mar. 27, 1924, pp. 265–268, 12 figs. Particulars of light car, capable of speed of from 55 to 60 m.p.h., yet at normal running it can cover 45 to 50 miles to a gallon of fuel; 4-cylindered engine.

Maxwell. Maxwell Practice Illustrates a New Method of Engine Mounting, P. M. Heldt. Automotive Industries, vol. 50, no. 14, Apr. 3, 1924, pp. 761–763, 4 figs. Vibration is reduced in new Maxwell car; at rear power plant has swivel support on frame about which it is free to move, since it is not secured rigidly at forward end.

Morris-Cowley. The 11.9 H.p. Morris-Cowley Chassis. Automobile Engr., vol. 14, no. 187, Mar 1924, pp. 64–72, 13 figs. Four-cylinder engine, with cylinders cast in block with upper half of crankcase, is bolted to 3-speed gear box, power being transmitted to bevel-driven rear axle through enclosed propeller shaft; frame is intended to take four-seater body.

Overland. Overland Cars. Auto-Motor Jl., vol. 29, no. 12, Mar. 20, 1924, pp. 245–248, 9 figs. Particulars of latest models. Four-cylinder high-speed engine with 3 3/8-in. bore and 4-in. stroke.

Producer-Gas Plants. A Compact Producer Gas Plant. Motor Transport (Lond.), vol. 38, no. 996, Mar. 31, 1924, p. 385, 2 figs. Brief particulars of Berliet-Imbert apparatus with which satisfactory demonstrations have been given before French military and civic authorities; in this case plant was fitted to a 15.9-hp. Berliet touring car; does not use steam in production of gas.

Rear Axles. Maxwell Methods of Making Rear Axle Parts, F. H. Colvin. Am. Mach., vol. 60, no. 16, Apr. 17, 1924, pp. 569–572, 8 figs. Drilling, boring and reaming fixtures; inspection gages, and running-in of complete rear end.

Springs. See SPRINGS, Automobile.

Trailers. A Dumping Trailer for Use With a Light Car, G. A. Luers. Am. Blacksmith & Motor Shop, vol. 23, no. 3, Mar. 1924, pp. 19–20, 4 figs. Describes trailer for use with light passenger automobile; capacity 1 cu. yd., which in gravel is about 1800 lb.

Transmissions. Continuously Variable Transmission Developed in America. Automotive Industries, vol. 50, no. 12, Mar. 20, 1924, pp. 674–675, 2 figs. Weiss invention has driving member in form of hemispherical shell within which is body known as mutor; latter unit is of ring, wheel, or disk form and rotates about its own axis on anti-friction bearing; stops car on hill without use of brakes.

Variable Transmission. Autocar, vol. 52, no. 1485, Apr. 4, 1924, p. 602, 3 figs. Describes device now under test to simplify gear box and back axle of car.

Wheel Manufacture. Oakland Concern Manufactures Disk Wheels. West. Machy. Wld., vol. 15, no. 3, Mar. 1924, pp. 95–96 and 108, 7 figs. Notes on manufacture of wheels produced by Westgate Metal Products Corp. of Oakland, Cal., engaged in quantity production of disk wheels for light and heavy passenger cars, trucks and tractors.

Willys-Knight. The Willys-Knight Car. Auto-Motor Jl., vol. 29, no. 14, Apr. 3, 1924, pp. 285–288, 12 figs. Sleeve-valve 4-cylindered engine with cylinders of 3 3/4-in. bore and 4 1/2-in. piston stroke, developing, on the brake, 40 hp.

AVIATION

Net-Cost Calculation. The Net Cost of Aerial Transportation (Le prix de revient des transports aériens), V. Carle. Aéronautique, vol. 6, no. 56, Jan. 1924, pp. 5–12, 8 figs. Method of calculating cost and studying influence of elements of cost, such as depreciation, volume of traffic, speed, etc.

AXLES

Fractures. Axle Fractures and Their Causes (Ueber Achsbrüche und die Erforschung ihrer Ursachen), M. Bermann. Organ für die Fortschritte des Eisenbahnwesens), vol. 78, no. 10, Oct. 15, 1923, pp. 198–202, 1 fig. Deals with fractures in case of uniform and non-uniform steel; fractures caused by steel of unequal chemical composition.

Ruckstell Two-Speed, Manufacture of. Manufacturing the Ruckstell Two-Speed Axle, H. P. Armson. Can. Machy., vol. 31, no. 14, Apr. 3, 1924, pp. 31–35, 5 figs. Producing and heat treating housings, ring gears, bronze supports, sliding and plate gear clutches, for passenger car and truck axles, at plant of Russel Gear and Machine Co., Toronto, Can.

B

BEARING METALS

Hardness. Rate of Cooling Determines Hardness of Alloy. Automotive Industries, vol. 50, no. 13, Mar. 27, 1924, p. 723. Results of researches into structure of ternary bearing-metal alloys by Dr. L. Kaul; it is shown that rate of cooling rather than pouring temperature determines hardness of alloy.

BEARINGS

Paper-Mill Machinery. The Most Efficient Type of Bearing for Paper Machinery, G. H. Spencer. Paper Mill, vol. 48, no. 15, Apr. 12, 1924, pp. 65–66, 68, 70 and 72f, 13 figs. Construction of plain babbitt bearing; functions and operations on paper machines of anti-friction bearing. Paper read at Tech. Assn. Pulp & Paper Industry.

BEARINGS, BALL

Automobile, Manufacture. Making Ball Bearings for Automobiles, H. R. Simonds. Abrasive Industry, vol. 5, no. 4, Apr. 1924, pp. 85–89, 10 figs. Use of angular contact; manufacture of radial bearings at plant of U. S. Ball Bearing Mfg. Co., Chicago, Ill.

Housings. Design of Ball Bearing Closures, T. C. Delaval-Crow. Am. Mach., vol. 60, no. 13, Mar. 27, 1924, pp. 453–457, 39 figs. Description of a variety of ball-bearing housing arrangements to prevent leakage of lubricant and entrance of foreign matter.

Manufactured by Advertisers — CLASSIFIED LIST OF MECHANICAL EQUIPMENT — Alphabetical List on page 156

Buckets, Elevator
* Brown Hoisting Machinery Co.
Chain Belt Co.
* Gifford-Wood Co.
* Hendrick Mfg. Co.
* Jones, W. A. Fdry. & Mach. Co.
Link-Belt Co.
Palmer-Bee Co.

Buckets, Grab
* Brown Hoisting Machinery Co.
Clyde Iron Works Sales Co.
Lidgerwood Mfg. Co.
Link-Belt Co.

Buckets, Self-Dumping
* Brown Hoisting Machinery Co.
Clyde Iron Works Sales Co.
Link-Belt Co.

Burners, Oil
Bethlehem Shipbldg.Corp'n(Ltd.)
* Combustion Engineering Corp'n
* Schutte & Koerting Co.
* Spray Engineering Co.

Burners, Powdered Fuel
Grindle Fuel Equipment Co.
* Quigley Furnace Specialties Co.

Bushings, Bronze
Hill Clutch Mach. & Fdry. Co.
* Wood's, T. B. Sons Co.

Cabinets and Tables, Blue Print Filing
Dietzgen, Eugene Co.
Economy Drawing Table & Mfg. Co.
Keuffel & Esser Co.
ParVell Laboratories
U. S. Blue Co.
Weber, F. Co. (Inc.)

Cableways, Excavating
Lidgerwood Mfg. Co.

Cableways, Hoisting and Conveying
Lidgerwood Mfg. Co.

Calorimeters
* American Schaeffer & Budenberg Corp'n
* Sarco Co. (Inc.)

Calorizing
Calorizing Co.

Cars, Charging
Easton Car & Construction Co.
* Whiting Corp'n

Cars, Industrial Railway
Easton Car & Construction Co.
Link-Belt Co.
* Whiting Corp'n

Cars, Trolley (Industrial Railway)
Link-Belt Co.

Casehardening
* American Metal Treatment Co.
Nuttall, R. D. Co.

Casings, Steel (Boiler)
* Casey-Hedges Co.
* Vogt, Henry Machine Co.
* Walsh & Weidner Boiler Co.

Castings, Acid Resistant
* U. S. Cast Iron Pipe & Fdry. Co.

Castings, Aluminum
Buffalo Bronze Die Casting Corp'n
DuPont Engineering Co.

Castings, Brass
* Croll-Reynolds Engineering Co.
Du Pont Engineering Co.
* Edward Valve & Mfg. Co.

Castings, Bronze
Buffalo Bronze Die Casting Corp'n

Castings, Die-Molded
* Doehler Die-Casting Co.
Veeder Mfg. Co.

Castings, Heavy
Farrel Foundry & Machine Co.
Hill Clutch Mach. & Fdry. Co.
* U. S. Cast Iron Pipe & Fdry. Co.

Castings, Iron
Bethlehem Shipbldg.Corp'n(Ltd.)
* Brown, A. & F. Co.
* Builders Iron Foundry
* Burhorn, Edwin Co.
* Casey-Hedges Co.
* Central Foundry Co.
Chain Belt Co.
* Cole, R. D. Mfg. Co.
* Croll-Reynolds Engineering Co.
DuPont Engineering Co.
* Falls Clutch & Machinery Co.
Farrel Foundry & Machine Co.
* Franklin Machine Co.
Garlock Packing Co.
* Harrisburg Fdry. & Mach. Wks.
Hill Clutch Machine & Fdry. Co.
* Jones, W. A. Fdry. & Mach. Co.
Lidgerwood Mfg. Co.
Link-Belt Co.
* Nordberg Mfg. Co.
* Pittsburgh Valve, Fdry. & Const. Co.
* Royersford Fdry. & Mach. Co.
Treadwell Engineering Co.
* U. S. Cast Iron Pipe & Fdry. Co.
* Vogt, Henry Machine Co.

Castings, Monel Metal
Driver-Harris Co., (In Canada)
* Edward Valve & Mfg. Co.

Castings, Nichrome
Driver-Harris Co.

Castings, Nickle Chromium
Driver-Harris Co.

Castings, Semi-Steel
* Builders Iron Foundry
Chain Belt Co.
* Croll-Reynolds Engrg. Co. (Inc.)
Farrel Foundry & Machine Co.
Hill Clutch Machine & Fdry. Co.
Link-Belt Co.
* Nordberg Mfg. Co.
* Vogt, Henry Machine Co.

Castings, Steel
* Falk Corporation
Link-Belt Co.
Mackintosh-Hemphill Co.
* Reading Steel Casting Co. (Inc.) (Reading Valve & Fittings Div.)
Treadwell Engineering Co.

Castings, White Metal
* Doehler Die-Casting Co.

Cement, Asbestos
Carey, Philip Co.

Cement, Iron and Steel
Smooth-On Mfg. Co.

Cement, Pipe Joint
Smooth-On Mfg. Co.

Cement, Refractory
* Celite Products Co.
Johns-Manville (Inc.)
* King Refractories Co. (Inc.)
* Quigley Furnace Specialties Co.

Cement, Water-Resistant
Smooth-On Mfg. Co.

Cement Machinery
* Allis-Chalmers Mfg. Co.
Hill Clutch Mach. & Fdry. Co.
Link-Belt Co.
* Smidth, F. L. & Co.
* Worthington Pump & Machinery Corp'n

Centrifugals, Chemical
Tolhurst Machine Works
Fletcher Works

Centrifugals, Metal Drying
Tolhurst Machine Works

Centrifugals, Sugar
Fletcher Works
Tolhurst Machine Works
* Worthington Pump & Mchry. Corp'n

Chain Belts and Links
Chain Belt Co.
* Diamond Chain & Mfg. Co.
* Gifford-Wood Co.
* Jones, W. A. Fdry. & Mach. Co.
Link-Belt Co.
Union Chain & Mfg. Co.
* Whitney Mfg. Co.

Chains, Block
Palmer-Bee Co.

Chains, Power Transmission
Baldwin Chain & Mfg. Co
Chain Belt Co.
* Diamond Chain & Mfg. Co.
Link-Belt Co.
* Morse Chain Co.
Union Chain & Mfg. Co.
* Whitney Mfg. Co.

Charging Machines
* Whiting Corp'n

Chimneys, Brick (Radial)
Morrison Boiler Co.

Chucking Machines
* Jones & Lamson Machine Co
* Warner & Swasey Co.

Chucks, Drill
* S K F Industries (Inc.)
* Whitney Mfg. Co.

Chucks, Tapping
* Whitney Mfg. Co.

Chutes
Chain Belt Co.
* Gifford-Wood Co.
* Hendrick Mfg. Co.
Link-Belt Co.

Cigar Making Machinery
* American Machine & Foundry Co.

Cigarette Making Machinery
* American Machine & Foundry Co.

Circuit Breakers
* General Electric Co.
* Westinghouse Elec. & Mfg. Co.

Circulators, Feed Water
* Schutte & Koerting Co.

Circulators, Steam Heating
* Schutte & Koerting Co.

Cloth, Rubber
Garlock Packing Co.
* Goodrich, B. F. Rubber Co.

Cloth, Tracing
Dietzgen, Eugene Co.
Keuffel & Esser Co.
New York Blue Print Paper Co.
ParVell Laboratories
U. S. Blue Co.
Weber, F. Co. (Inc.)

Clutches, Friction
* Allis-Chalmers Mfg. Co.
* Brown A. & F. Co.
* Falls Clutch & Machinery Co.
Farrel Foundry & Machine Co.
Fletcher Works
* Gifford-Wood Co.
Hill Clutch Mach. & Fdry. Co.
Johnson, Carlyle Machine Co.
* Jones, W. A. Fdry. & Mach. Co.
Link-Belt Co.
* Medart Co.
Philadelphia Gear Works
* Western Engineering & Mfg. Co.
* Wood's, T. B. Sons Co.

Coal
Pennsylvania Coal & Coke Co.

Coal and Ash Handling Machinery
* Brown Hoisting Machinery Co.
Chain Belt Co.
* Gifford-Wood Co.
Link-Belt Co.
Palmer-Bee Co.

Coal Bins
* Brown Hoisting Machinery Co.
Chain Belt Co.
Link-Belt Co.

Coal Breakers and Cleaners
Pennsylvania Crusher Co.

Coal Mine Equipment and Supplies
* General Electric Co.

Coal Mining Machinery
* General Electric Co.
* Ingersoll-Rand Co.

Coal Preparing Equipment
Grindle Fuel Equipment Co.

Coaling Stations, Locomotive
Chain Belt Co.
* Gifford-Wood Co.
Link-Belt Co.

Coating (Metal Protecting)
* American Machine & Foundry Co.

Cocks, Air and Gage
* American Schaeffer & Budenberg Corp'n
* Ashton Valve Co.
* Crane Co.
* Jenkins Bros.
Lunkenheimer Co.
* Reading Steel Casting Co. (Inc.) (Pratt & Cady Division)
* Vogt, Henry Machine Co.

Cocks, Blow-off
* Crane Co.
Lunkenheimer Co.
* Pittsburgh Valve, Fdry. & Const. Co.
* Reading Steel Casting Co. (Inc.) (Pratt & Cady Division)

Cocks, Three-Way and Four-Way
* American Schaeffer & Budenberg Corp'n
* Crane Co.
* Crosby Steam Gage & Valve Co.
Lunkenheimer Co.
* Pittsburgh Valve, Fdry. & Const. Co.
* Reading Steel Casting Co. (Inc.) (Pratt & Cady Division)

Coils, Pipe
* Superheater Co
* Vilter Mfg. Co.
* Vogt, Henry Machine Co.

Coke
Pennsylvania Coal & Coke Co.

Cold Storage Plants
* De La Vergne Machine Co.

Collars, Shafting
Chain Belt Co.
Hill Clutch Machine & Fdry. Co.
Link-Belt Co.
* Medart Co.
* Royersford Fdry. & Mach. Co.
* Wood's, T. B. Sons Co.

Coloring (Metal)
* American Metal Treatment Co.

Combustion (CO_2) Recorders
* Sarco Co. (Inc.)
* Tagliabue, C. J. Mfg. Co.
* Uehling Instrument Co.

Compressors, Air
* Allis-Chalmers Mfg. Co.
* General Electric Co.
* Goulds Mfg. Co.
* Ingersoll-Rand Co.
Mackintosh-Hemphill Co.
* Nordberg Mfg. Co.
* Titusville Iron Works Co.
* Wayne Tank & Pump Co.
* Worthington Pump & Machinery Corp'n

Compressors, Air, Centrifugal
* De Laval Steam Turbine Co.
* General Electric Co.

Compressors, Air, Compound
* Ingersoll-Rand Co.
* Nordberg Mfg. Co.
* Worthington Pump & Machinery Corp'n

Compressors, Ammonia
* Frick Co. (Inc.)
* Ingersoll-Rand Co.
* Vilter Mfg. Co.
* Vogt, Henry Machine Co.
* Worthington Pump & Machinery Corp'n

Compressors, Gas
* De Laval Steam Turbine Co.
* General Electric Co.
* Ingersoll-Rand Co.
* Nordberg Mfg. Co.
* Worthington Pump & Machinery Corp'n

Condensers, Ammonia
* De La Vergne Machine Co.
* Frick Co. (Inc.)
* Ingersoll-Rand Co.
* Vilter Mfg. Co.
* Vogt, Henry Machine Co.

Condensers, Barometric
* Allis-Chalmers Mfg. Co.
Buffalo Steam Pump Co.
* Ingersoll-Rand Co.
* U. S. Cast Iron Pipe & Fdry. Co.
* Wheeler, C. H. Mfg. Co.
* Wheeler Condenser & Engrg. Co.
* Worthington Pump & Machinery Corp'n

Condensers, Jet
* Allis-Chalmers Mfg. Co.
Buffalo Steam Pump Co.
Elliott Co.
* Ingersoll-Rand Co.
* Nordberg Mfg. Co.
* Schutte & Koerting Co.
* Wheeler, C. H. Mfg. Co.
* Wheeler Condenser & Engrg. Co.
* Worthington Pump & Machinery Corp'n

Condensers, Surface
* Allis-Chalmers Mfg. Co.
Bethlehem Shipbldg.Corp'n(Ltd.)
Elliott Co.
* Ingersoll-Rand Co
* Nordberg Mfg. Co.
* Westinghouse Electric & Mfg. Co
* Wheeler, C. H. Mfg. Co.
* Wheeler Condenser & Engrg. Co.
* Worthington Pump & Machinery Corp'n

Conduits
Johns-Manville (Inc.)

Controllers, Automatic, for Temperature or for Pressure
(See Regulators)

Controllers, Electric
* General Electric Co.
* Westinghouse Electric & Mfg. Co.

Controllers, Filter Rate
* Builders Iron Foundry
* Simplex Valve & Meter Co.

Controllers, Liquid Level
* General Electric Co.
* Simplex Valve & Meter Co.
* Tagliabue, C. J. Mfg. Co.

Converters, Steel
* Whiting Corporation

Converters, Synchronous
* Allis-Chalmers Mfg. Co.
* General Electric Co.
Ridgway Dynamo & Engine Co.
* Westinghouse Electric & Mfg. Co.

Conveying Machinery
* Brown Hoisting Machinery Co
Chain Belt Co.
* Gifford-Wood Co.
Hill Clutch Machine & Fdry. Co.
* Jones, W. A. Fdry. & Mach. Co.
Link-Belt Co.
Palmer-Bee Co.

*Catalogue data of firms marked * appear in the A.S.M.E. Condensed Catalogues of Mechanical Equipment, 1923-24 Volume*

Loads. Ball-bearing Loads. Machy. (Lond.), vol. 23, no. 597, Mar. 6, 1924, pp. 738–739, 3 figs. Details of new formula for determining ball-bearing loads in pamphlet issued by Tormo Mfg. Co., London; no actual formula is given, necessary data being supplied by three charts.

BEARINGS, THRUST

Pad Type. Thrust Bearings of Pad Construction, F. Johnstone-Taylor. Machy. (N. Y.), vol. 30, no. 8, Apr. 1924, pp. 619–621, 5 figs. Construction of pad thrust collars; pad system applied to thrust washers; thrust washer for vertical shaft; end thrust bearings of pad construction; etc.

BELT DRIVE

Principles. Power Transmission by Belting, J. E. Rhoads. Paper, vol. 33, no. 21, Mar. 13, 1924, pp. 11–12. Some of the principles entering into power transmission by belting.

BELTING

Leather. Slip, Friction and Stretch Tests for Leather Belting, L. C. Morrow. Am. Mach., vol. 60, no. 13, Mar. 27, 1924, pp. 469–471, 8 figs. Describes tests performed in plant of J. E. Rhoads & Sons, Philadelphia, Pa.

BOILER EXPLOSIONS

Locomotives. Boiler Explosion Caused by Failure of Crown Sheet. Boiler Maker, vol. 24, no. 3, Mar. 1924, pp. 76–78, 4 figs. Particulars regarding Chicago & North Western locomotive No. 2455 explosion at Belle Plaine, Iowa, July 1923; indicates importance of equipping boilers with water columns to check water level.

BOILER FEEDWATER

Measurement. Measuring the Feed Water in a Boiler Test, J. W. Gavett, Jr. Power, vol. 59, no. 15, Apr. 8, 1924, pp. 567–568, 3 figs. Discusses arrangement of apparatus for measuring feedwater; necessary apparatus; best method of computing quantity of water from readings of head.

BOILER PLANTS

Coaling and Ash Removal. Coaling and Ash Removal in Boiler Houses (Kesselhausbekohlung und -entaschung), R. Baumann. Wärme, vol. 47, nos. 6 and 7, Feb. 8 and 15, 1924, pp. 51–63 and 63–65, 16 figs. Describes boiler-house coaling plant with tipping and gripping devices of great efficiency and requiring little attendance; and method for removal, cooling and loading into ash car of red-hot ashes; points out cleanliness and economy of method.

BOILERS

Benson High-Pressure. Steam Generation at the Critical Temperature. Chem. & Industry, vol. 43, no. 10, Mar. 7, 1924, pp. 249–250. Describes Benson 3200-lb. pressure boiler.

The Benson Boiler. Electrician, vol. 92, no. 2391, Mar. 14, 1924, p. 324. Theoretical principles of steam generator with a working pressure of 3200 lb. per sq. in.

Crown Stay Angles, Sine Determination. Method of Finding the Sines of the Angles Formed by Crown Stays, E. Hall. Boiler Maker, vol. 24, no. 3, Mar. 1924, pp. 80–81, 1 fig. Shows how sine of each of the different angles which crown stays make with vertical axis of boiler may be found and how to use value so found in formula where term $\xi \sin \alpha$ is used.

Flue Replacement. Saving Time and Labor on Flue Jobs, C. A. Chincholl. Boiler Maker, vol. 24, no. 3, Mar. 1924, pp. 78–79 and 91–92, 1 fig. Construction and usefulness of three devices necessary wherever boiler flues are replaced in boilers, viz., a flue swaging machine for 2-in. flues, a flue cutter for cutting flues to length and an attachment for an air motor to cut flues in front end.

Excess Air, Effect of. Effect of Excess Air on Flue Temperatures and on Efficiency, A. K. Bak. Power, vol. 59, no. 17, Apr. 22, 1924, pp. 634–636, 8 figs. Variation in air quantity has direct effect upon mass of gas discharged and also gives rise to changes in flue-gas temperature; air quantity thus has important bearing on boiler losses and efficiency. Results of tests made at Connors Creek to establish relation between excess air and stack-gas temperature for particular boiler and setting.

Large. Large Steam Boilers and Steam Storage in Germany. Power Engr., vol. 19, no. 216, Mar. 1924, pp. 86–89, 5 figs. Review of German technical publication by Fried. Münzinger, on American and German large steam boilers.

Marine. See MARINE BOILERS.

Testing. Importance of Boiler Plant Test, H. Seymour. Electrician, vol. 92, no. 2392, Mar. 21, 1924, pp. 351 and 357. How to conduct a test to find out how well boilers are doing their work.

Types. Steam Boiler Manufacture in Germany and America. La. Planter & Sugar Mfr., vol. 72, no. 11, Mar. 15, 1924, pp. 216–217. Different types of boilers used in various manufacturing concerns. Translation of article by K. Schiebl in Centralblatt für die Zuckerindustrie.

Water-Circulating Apparatus. Increasing the Efficiency of Boiler Plants (Zur Leistungssteigerung von Dampfkesselanlagen), P. Fessler. Wärme- u. Kälte-Technik, vol. 26, no. 4, Feb. 15, 1924, pp. 23–25, 4 figs. Study of water circulation; it is shown that artificial water circulation through so-called water-circulating apparatus is effective in increasing efficiency of boiler and at same time increasing economy of plant.

BOILERS, WATER-TUBE

Clayton. The Clayton Water-Tube Boiler. Eng. & Boiler House Rev., vol. 37, no. 9, Apr. 1924, p. 328, 1 fig. Notes on boiler which is development of Clayton & Shuttleworth, Ltd.; made in two distinct types, straight-tube sectional and curved-tube drum type.

BRAKES

Freight-Train. Hand Brakes on Goods Trains, E. Choquet. Int. Ry. Congress Assn.—Bul., vol. 6, no. 3, Mar. 1924, pp. 220–238, 5 figs. Solution of problem of hand brakes for goods trains which consists in determining, for a train of any composition, weight which must be braked in order that stops may be made from any given speed within a certain distance, gradients of line being taken into consideration.

BRAKING

Regenerative. The Characteristics of a D. C. Series Machine Self-Excited by Rectified Current for Purposes of Regenerative Control, R. D. Archibald. Instn. Elec. Engrs.—Jl., vol. 62, no. 327, Mar. 1924, pp. 233–242, 11 figs. Discusses present position of regenerative control for street cars and describes method of self-exciting field of series motor with low-voltage rectified current transformed from a.c. tappings in armature; calculations for finding conditions of sparkless commutation of rectifier, and tests which corroborate calculations; practical application of device.

BRASS

Extrusion of Rods. The Extrusion and Drawing of Brass Rod, J. Williams. Am. Mach., vol. 66, no. 14, Apr. 3, 1924, pp. 497–498, 3 figs. Process of cold-drawing of brass rods as practiced by Bridgeport Brass Co., in production of commercial rods.

Properties, Determination of. Methods of Determining Physical Properties of Brass, A. A. Baldwin. Brass Wld., vol. 20, no. 3, Mar. 1924, pp. 77–79, 9 figs. Physical properties of brass, and tests for each.

BRASS FOUNDRIES

Record Keeping. Controlling Brass Shop Detail, F. W. Rowe. Foundry, vol. 52, no. 6, Mar. 15, 1924, pp. 226–229, 7 figs. Close tab on weights, mixtures and other data is checked on operations in non-ferrous foundry; charts shown which help to record operations and metal compositions and properties.

BRONZES

Characteristics. Mechanical Bronzes, E. G. Jarvis. Brass Wld., vol. 20, no. 3, Mar. 1924, pp. 81–83. Discussion of characteristics of various bronzes.

C

CALCULATING MACHINES

Monroe. Every Machine Piece Given Hardness Test, L. S. Love. Iron Age, vol. 113, no. 12, Mar. 20, 1924, pp. 854–856, 3 figs. Describes some machining operations in manufacture of Monroe calculating machine built by Monroe Calculating Machine Co., Orange, N. J.; carbonized parts subject to test before assembly in machine.

CAR WHEELS

Foundry Practice. Twin Cupolas Melt Wheel Iron, P. Dwyer. Foundry, vol. 52, no. 8, Apr. 15, 1924, pp. 287–293 and 322, 10 figs. Describes new process introduced in Albany plant of Albany Car Wheel Co., consisting in melting iron in twin cupolas, allowing it to collect in central chamber and tapping it therefrom into mixing ladle; to insure continuous operation two pairs of cupolas have been installed.

CARBON MONOXIDE

Detector and Alarm. Notes on a Carbon-Monoxide Detector and Alarm, J. A. Vaughan. S. African Instn. Engrs.—Jl., vol. 22, no. 7, Feb. 1924, pp. 98–103, 2 figs. Describes instrument intended for automatic detection of small traces of CO in atmosphere, so arranged that a bell is caused to ring when small traces, such as one part in two thousand, or even less, are present in atmosphere supplied to instrument.

CARBURETORS

Beach. Beach Carburetor is Constant Vacuum Type. Automotive Industries, vol. 50, no. 12, Mar. 20, 1924, p. 671, 1 fig. Carburetor of variable venturi or constant-vacuum type with wood float located in float chamber concentric with mixing chamber; makes use of float valve consisting of ball of tobin bronze.

Heavy-Oil. The B. M. W. Heavy-Oil Carburetor (Der. B. M. W.-Schweröl-Vergaser), B. Katz. Allgemeine Automobil-Zeitung, vol. 25, nos. 7–8 and 9, Feb. 16 and 26, 1924, pp. 28–29 and 31–32, 3 figs. Describes two types of BMW carburetors which have given excellent results when used in trucks, omnibuses and motor boats.

Zenith. High-Speed Petrol and Paraffin Engines, J. Okill. Gas. & Oil Power, vol. 19, no. 222, Mar. 6, 1924, pp. 107–108, 4 figs. Describes Zenith and Claudel-Hobson carburetors.

The Zenith Carburetor with Graded Atomization (Der Zenith-Vergaser mit stufiger Zerstäubung). Automobil-Rundschau, vol. 23, no. 1, Jan. 1924, pp. 7–8, 1 fig. Describes new Zenith carburetor and principle upon which design is based.

CARS

Dynamometer. Dynamometer Car Used on the Great Western Railway. Ry. Engr., vol. 44, no. 572, Dec. 1923, pp. 466–472, 8 figs. Description of design, equipment and use of car for determining factors in working of locomotives and trains.

New Dynamometer Car, New York Central R. R. Ry. Rev., vol. 74, no. 15, Apr. 12, 1924, pp. 687–691, 6 figs. Special car contains modern devices for recording locomotive performance.

Repairing, Welding and Cutting in. Welding and Cutting in Connection with Car Repairs, H. W. L. Porth. Acetylene Jl., vol. 25, no. 6, Dec. 1923, pp. 286, 288 and 290. Welding of car parts by oxy-acetylene process, and use of cutting torch in car repairing.

Steel, Scrapping. Scrapping Steel Cars by Electric Arc Process, A. M. Candy. Ry. Mech. Engr., vol. 98, no. 4, Apr. 1924, pp. 217–219, 4 figs. Facilities and methods which are applicable where large number of cars are to be handled.

CARS, FREIGHT

Transformer-Transportation. New Transformer Cars for the New York, New Haven & Hartford R. R. Ry. Rev., vol. 74, no. 15, Apr. 12, 1924, pp. 683–685, 2 figs. 70-ton capacity steel underframe transformer cars built by Standard Steel Car Co ; designed to carry load of 150,000 lb. uniformly distributed over length of 24 ft. at center of car.

Truck Frames. Washburn Side Frame for Arch Bar Trucks. Ry. Age, vol. 76, no. 19, Apr. 12, 1924, pp. 937–949, 4 figs. Describes frames of unique design used by Baltimore & Ohio on box and gondola cars.

CARS, PASSENGER

Steel Suburban. Steel Suburban Cars for Missouri Pacific. Ry. Mech. Engr., vol. 98, no. 4, Apr. 1924, pp. 220–222, 7 figs. Unique seating arrangement provides for 117 passengers with weight of 1000 lb. each.

Ventilation. Ventilation and Heating of Railway Passenger Cars, K. F. Nystrom. Can. Ry. Club—Proc., vol. 23, no. 2, Feb. 1924, pp. 24–62 and (discussion) 62–75, 13 figs. Influence of occupants on temperature and humidity; CO_2 content in relation to ventilation; mechanical refinements required for ideal ventilation; factors essential to economical and efficient ventilation; ventilating systems now in use. Heat losses; heat requirements; radiation surface and fuel required for heating.

CARS, TANK

Development and Manufacture. Modern Tank Car is Industry's Bucket that Goes to the Well, A. S. Taylor. Compressed Air Mag., vol. 29, no. 3, Mar. 1924, pp. 813–818, 15 figs. Notes on origin, development, and manufacture.

CASE-HARDENING

Case-Depth Measurement. What Is Case Depth, S. P. Rockwell and F. Downes. Am. Soc. Steel Treating, vol. 5, no. 3, Mar. 1924, pp. 285–295 and (discussion) 295–301, 4 figs. Shows variations which are normally obtained by various methods of measuring carburized case depths, using five standard steels under two different lengths of time, handled according to good hardening shop practice; shows necessity for more accurate specifications as regards case depth.

CAST IRON

Decomposition by Acid. Acid Decomposes Cast Iron. Foundry, vol. 52, no. 5, Mar. 15, 1924, pp. 231–232, 3 figs. Chemical and physical peculiarities noted in casting which has been subjected to corrosive influence of dilute sulphuric solution covering long period.

Gray, Growth of. Studies Growth of Gray Iron, T. E. Hull. Foundry, vol. 52, no. 7, Apr. 1, 1924, pp. 253–254. Experimental work of Moissan with graphite reviewed and theory for growth of cast iron under repeated heating and cooling is evolved; graphite in iron absorbs gases.

Heat-Treatment Experiments. Some Experiments on Cast Iron, J. W. Donaldson. West of Scotland Iron & Steel Inst.—Jl., vol. 31, part 4, Jan. 1924, pp. 54–57 and (discussion) 58–62, 1 fig. Experiments carried out with view to determining what effect low-temperature heat treatment had on good cylinder iron and on irons of similar composition containing small additions of various elements.

Tests. Physical Tests for Cast Iron, J. Shaw. Foundry Trade Jl., vol. 29, nos. 396 and 397, Mar. 20 and 27, 1924, pp. 226–227 and 262–263, 2 figs. Discusses tests made; present-day specifications; new railway specifications; American conditions; comments on tensile testing; chemical analysis.

CASTING

Green Sand Cores, with. New Methods for the Production of Castings with Green Sand Cores (Neue Wege in der Herstellung von Gussstücken mit grünen Kernen), F. Freytag. Giesserei-Zeitung, vol. 21, no. 4, Feb. 15, 1924, pp. 62–65, 11 figs. A new method for production of electric-motor casings with cast-on webs and flanges, according to which not only casing core, but also flange core is set in green sand mold and boxes are decanted in green state.

Lead Alloys. Casting Lead Alloys in Endless Strips. Machy. (N. Y.), vol. 30, no. 8, Apr. 1924, pp. 610–612, 2 figs. Method used by Hazelett Storage Battery Co., Cleveland, Ohio, in manufacture of grids for storage batteries that is applicable in other fields of industry.

CASTINGS

Efficient Design. Efficient Casting Design, F. C. Edwards. Engineering, vol. 117, no. 3040, Apr. 4, 1924, p. 423. Points out that to be really efficient, casting design should tend to reduce operation of molding to its simplest possible terms consistent with ultimate purpose of casting.

Production. Some Necessary Adjustments between the Foundry and Drawing Office, E. Ronceray. Foundry Trade Jl., vol. 29, no. 393, Feb. 28, 1924, pp. 180–183 (discussion) 183–184, 11 figs. Discusses points for common interest of both foundryman and engineer; requirements of engineer, internal strains in castings, real object of making castings without feeding heads, defects, strength of cast iron, etc.

CENTRAL STATIONS

Devon Station, Conn. Devon Station Marks For-

Manufactured by Advertisers — CLASSIFIED LIST OF MECHANICAL EQUIPMENT — Alphabetical List on page 156

Conveying Systems, Powdered Coal
Grindle Fuel Equipment Co.

Conveyor Systems, Pneumatic
* Allington & Curtis Mfg Co.
* Sturtevant, B. F. Co.

Conveyors, Belt
* Brown Hoisting Machinery Co.
Chain Belt Co.
Gandy Belting Co.
* Gifford-Wood Co.
Link-Belt Co.

Conveyors, Bucket, Pan or Apron
* Brown Hoisting Machinery Co.
Chain Belt Co.
* Gifford-Wood Co.
* Jones, W. A. Fdry. & Mach. Co.
Link-Belt Co.

Conveyors, Chain
* Brown Hoisting Machinery Co.
Chain Belt Co.
Link-Belt Co.

Conveyors, Ice
Chain Belt Co.
* Gifford-Wood Co.
Link-Belt Co.

Conveyors, Portable
* Gifford-Wood Co.
Link-Belt Co.

Conveyors, Screw
Chain Belt Co.
* Gifford-Wood Co.
Link-Belt Co.

Cooling Ponds, Spray
* Cooling Tower Co. (Inc.)
* Schutte & Koerting Co.
* Spray Engineering Co.

Cooling Towers
* Burhorn, Edwin Co.
* Cooling Tower Co. (Inc.)
* Spray Engineering Co.
* Wheeler, C. H. Mfg. Co.
* Wheeler Condenser & Engrg. Co.
* Worthington Pump & Machinery Corp'n

Copper, Drawn
* Roebling's, John A. Sons Co.

Copper Converting Machinery
* Allis-Chalmers Mfg. Co.
* Worthington Pump & Machinery Corp'n

Counters, Revolution
* American Schaeffer & Budenberg Corp'n
* Ashton Valve Co.
* Bristol Co.
* Crosby Steam Gage & Valve Co.
Veeder Mfg. Co.

Countershafts
* Builders Iron Foundry
Hill Clutch Machine & Fdry. Co.
* Royersford Fdry. & Mach. Co.
* Wood's, T. B. Sons Co.

Couplings, Pipe
Byers, A. M. Company
* Central Foundry Co.
* Crane Co.
Lunkenheimer Co.

Coupling, Shaft (Flexible)
* Allis-Chalmers Mfg. Co.
* Brown, A. & F. Co.
* Falk Corporation
* Fawcus Machine Co.
Hill Clutch Machine & Fdry. Co.
* Jones, W. A. Fdry. & Mach. Co.
* Medart Co.
* Nordberg Mfg. Co.
Nuttall, R. D. Co.
* Smith & Serrell

Coupling, Shaft (Rigid)
* Allis-Chalmers Mfg. Co.
* Brown, A. & F. Co.
Chain Belt Co.
Cumberland Steel Co.
* Falls Clutch & Machinery Co.
Farrel Foundry & Machine Co.
* General Electric Co.
Hill Clutch Machine & Fdry. Co.
* Jones, W. A. Fdry. & Mach. Co.
Link-Belt Co.
* Medart Co.
* Royersford Fdry. & Mach. Co.
* Smith & Serrell
* Wood's, T. B. Sons Co.

Couplings, Universal Joint
* Wood's, T. B. Sons Co.

Coverings, Steam Pipe
Carey, Philip Co.
Johns-Manville (Inc.)

Cranes, Electric Traveling
Palmer-Bee Co.
* Whiting Corporation

Cranes, Floor (Portable)
Lidgerwood Mfg. Co.

Cranes, Gantry
* Brown Hoisting Machinery Co.
Link-Belt Co.
* Whiting Corp'n

Cranes, Hand Power
* Brown Hoisting Machinery Co.
Clyde Iron Works Sales Co.
Palmer-Bee Co.
* Whiting Corp'n

Cranes, Jib
* Brown Hoisting Machinery Co.
Palmer-Bee Co.
* Whiting Corp'n

Cranes, Locomotive
* Brown Hoisting Machinery Co.
Link-Belt Co.

Cranes, Locomotive (Crawler)
Link-Belt Co.

Cranes, Pillar
* Brown Hoisting Machinery Co.
* Whiting Corp'n

Cranes, Portable
* Brown Hoisting Machinery Co.
Clyde Iron Works Sales Co.
Link-Belt Co.

Crucibles, Graphite
Dixon, Joseph Crucible Co.

Crushers, Clinker
Farrel Foundry & Machine Co.

Crushers, Coal
* Allis-Chalmers Mfg. Co.
* Brown Hoisting Machinery Co.
* Gifford-Wood Co.
Link-Belt Co.
Pennsylvania Crusher Co.
* Smidth, F. L. & Co.
* Worthington Pump & Machinery Corp'n

Crushers, Hammer
Pennsylvania Crusher Co.

Crushers, Jaw
Farrel Foundry & Machine Co.
* Worthington Pump & Machinery Corp'n

Crushers, Ore and Rock
Farrel Foundry & Machine Co.
* Nordberg Mfg. Co.
Pennsylvania Crusher Co.

Crushers, Roll
Link-Belt Co.
Pennsylvania Crusher Co.
* Worthington Pump & Machinery Corp'n

Crushing and Grinding Machinery
* Allis-Chalmers Mfg. Co.
Farrel Foundry & Machine Co.
Pennsylvania Crusher Co.
* Smidth, F. L. & Co.
* Worthington Pump & Machinery Corpn'

Cupolas
* Bigelow Co.
* Whiting Corp'n

Cutters, Bolt
* Landis Machine Co. (Inc.)

Cutters, Milling
* Whitney Mfg. Co.

Dehumidifying Apparatus
* American Blower Co.
* Carrier Engineering Corp'n

Desaturators
* United Machine & Mfg. Co.

Derricks and Derrick Fittings
Clyde Iron Works Sales Co.
Lidgerwood Mfg. Co.

Diaphragms, Rubber
* United States Rubber Co.

Die Castings
(See Castings, Die Molded)

Die Heads, Thread Cutting (Self-opening)
* Jones & Lamson Machine Co.
* Landis Machine Co. (Inc.)

Dies, Punching
* Niagara Machine & Tool Works

Dies, Sheet Metal Working
* Niagara Machine & Tool Works

Dies, Stamping
* Niagara Machine & Tool Works

Dies, Thread Cutting
* Jones & Lamson Machine Co.
* Landis Machine Co. (Inc.)

Diesel Engines
(See Engines, Oil, Diesel)

Digesters
* Bigelow Co.

Distilling Apparatus
* Vogt, Henry Machine Co.

Drafting Room Furniture
Dietzgen, Eugene Co.
Economy Drawing Table & Mfg. Co.
Keuffel & Esser Co.
New York Blue Print Paper Co.
ParVell Laboratories
U. S. Blue Co.
Weber, F. Co. (Inc.)

Drawing Instruments and Materials
Dietzgen, Eugene Co.
Keuffel & Esser Co.
New York Blue Print Paper Co.
ParVell Laboratories
U. S. Blue Co.
Weber, F. Co. (Inc.)

Dredges, Hydraulic
* Morris Machine Works

Dredging Machinery
Lidgerwood Mfg. Co.
* Morris Machine Works

Dredging Sleeve
* United States Rubber Co.

Drilling Machines, Sensitive
* Royersford Fdry. & Mach. Co.

Drilling Machines, Vertical
* Royersford Fdry. & Mach. Co.

Drills, Coal and Slate
* General Electric Co.
* Ingersoll-Rand Co.

Drills, Core
* Ingersoll-Rand Co.

Drills, Rock
* General Electric Co.
* Ingersoll-Rand Co.

Drinking Fountains, Sanitary
Johns-Manville (Inc.)
Murdock Mfg. & Supply Co.

Dryers, Coal
Grindle Fuel Equipment Co.

Dryers, Rotary
* Bigelow Co.
Farrel Foundry & Machine Co.
Link-Belt Co.
* Sturtevant, B. F. Co.

Drying Apparatus
* American Blower Co.
* Carrier Engineering Corp'n
* Clarage Fan Co.
* Sturtevant, B. F. Co.

Dust Collecting Systems
* Allington & Curtis Mfg. Co.
* Allis-Chalmers Mfg. Co.
* Clarage Fan Co.
* Sturtevant, B. F. Co.

Dust Collectors
* Allington & Curtis Mfg. Co.
* Allis-Chalmers Mfg. Co.
* Sturtevant, B. F. Co.

Dynamometers
* American Schaeffer & Budenberg Corp'n
* General Electric Co.
* Wheeler, C. H. Mfg. Co.

Economizers, Fuel
* Green Fuel Economizer Co.
* Power Specialty Co.
* Sturtevant, B. F. Co.

Ejectors
* Schutte & Koerting Co.

Electrical Machinery
* Allis-Chalmers Mfg. Co.
* General Electric Co.
* Westinghouse Electric & Mfg. Co.

Electrical Supplies
* General Electric Co.
Johns-Manville (Inc.)

Elevating and Conveying Machinery
* Brown Hoisting Machinery Co.
Chain Belt Co.
* Gifford-Wood Co.
* Jones, W. A. Fdry. & Mach. Co.
Link-Belt Co.
Palmer-Bee Co.

Elevators, Bucket & Chain
Gandy Belting Co.

Elevators, Electric
* American Machine & Foundry Co.

Elevators, Hydraulic
* Whiting Corp'n

Elevators, Pneumatic
* Whiting Corp'n

Elevators, Portable
* Gifford-Wood Co.
Link-Belt Co.

Elevators, Telescopic
Link-Belt Co.

Emery Wheel Dressers
* Builders Iron Foundry

Engine Repairs
* Franklin Machine Co.
* Nordberg Mfg. Co.

Engine Stops
* Schutte & Koerting Co

Engines, Blowing
* Allis-Chalmers Mfg. Co.
Mackintosh-Hemphill Co.
* Nordberg Mfg. Co.
* Worthington Pump & Machinery Corp'n

Engines, Gas
* Allis-Chalmers Mfg. Co.
* De La Vergne Machine Co.
* Ingersoll-Rand Co.
* Titusville Iron Works Co.
* Westinghouse Electric & Mfg. Co.

Engines, Gasoline
Detroit Marine-Aero Engine Co.
* Sturtevant, B. F. Co.
* Titusville Iron Works Co.
* Worthington Pump & Machinery Corp'n

Engines, Hoisting
* Allis-Chalmers Mfg. Co.
Clyde Iron Works Sales Co.
Lidgerwood Mfg. Co.
* Morris Machine Works
* Nordberg Mfg. Co.

Engines, Kerosene
* Worthington Pump & Machinery Corp'n

Engines, Marine
Bethlehem Shipbldg.Corp'n(Ltd.)
* Ingersoll-Rand Co.
Johnson, Carlyle Machine Co.
* Nordberg Mfg. Co.
* Sturtevant, B. F. Co.
* Ward, Chas. Engineering Works
* Worthington Pump & Machinery Corp'n

Engines, Marine, Oil
Bethlehem Shipbldg.Corp'n(Ltd.)
* Ingersoll-Rand Co.
* Nordberg Mfg. Co.

Engines, Marine, Steam
Bethlehem Shipbldg.Corp'n(Ltd.)
* Nordberg Mfg. Co.

Engines, Oil
* Allis-Chalmers Mfg. Co.
Bethlehem Shipbldg.Corp'n(Ltd.)
* De La Vergne Machine Co.
* Ingersoll-Rand Co.
* Nordberg Mfg. Co.
* Titusville Iron Works Co.
* Worthington Pump & Machinery Corp'n

Engines, Oil, Diesel
* Allis-Chalmers Mfg. Co.
Bethlehem Shipbldg.Corp'n(Ltd.)
* Nordberg Mfg. Co.
* Worthington Pump & Machinery Corp'n

Engines, Pumping
* Allis-Chalmers Mfg. Co.
* Ingersoll-Rand Co.
* Morris Machine Works
* Nordberg Mfg. Co.
* Worthington Pump & Machinery Corp'n

Engines, Steam
* Allis-Chalmers Mfg. Co.
* American Blower Co.
Bethlehem Shipbldg.Corp'n (Ltd.)
* Clarage Fan Co.
Clyde Iron Works Sales Co.
* Cole, R. D. Mfg. Co.
* Engberg's Electric & Mech. Wks.
* Erie City Iron Works
* Harrisburg Fdry. & Mach. Wks.
* Ingersoll-Rand Co.
* Leffel, James & Co.
Lidgerwood Mfg. Co.
Mackintosh-Hemphill Co.
* Morris Machine Works
* Nordberg Mfg. Co.
Ridgway Dynamo & Engine Co.
* Skinner Engine Co.
* Sturtevant, B. F. Co.
* Titusville Iron Works Co.
* Troy Engine & Machine Co.
* Vilter Mfg. Co.
* Westinghouse Electric & Mfg. Co.
* Wheeler, C. H. Mfg. Co.

*Catalogue data of firms marked * appear in the A.S.M.E. Condensed Catalogues of Mechanical Equipment, 1923-24 Volume*

ward Step in Development of New England Superpower. Elec. World, vol. 83, no. 12, Mar. 22, 1924, pp. 562–570, 12 figs. New base-load, high-tension plant of Conn. Light & Power Co. designed for 200,000-kva. rating; mechanical and electrical features.

Motor-Truck Transportation. "Gas" Trucks in Central-Station Service. Elec. World, vol. 83, no. 15, Apr. 12, 1924, pp. 721–724, 5 figs. Survey of representative practices in all parts of United States; trend toward standardization; data on costs, performances, types and uses.

Output and Distribution, N. America. Fourteen Systems with Output of More than a Billion Kilowatt-Hours in 1923. Elec. World, vol. 83, no. 15, Apr. 12, 1924, pp. 715–719. Tabular data on output and peak load of largest generating and distributing companies in United States and Canada; 1923 detailed output and distribution data for North American Systems.

Peoria, Ill. New Station Under Construction at Peoria, Illinois. Power, vol. 59, no. 17, Apr. 22, 1924, pp. 630–633, 3 figs. Initial section of 5-unit plant consisting of two 20,000-kw. turbo-generators, each served by two 13,920-sq. ft. boilers burning pulverized coal, designed for 400-lb. pressure and 250-deg. superheat; closed feedwater system with automatic deaëration of water; other features.

St. Louis, Mo. Cahokia—A Masterpiece, F. J. Crolius. Blast Furnace & Steel Plant, vol. 12, no. 4, Apr. 1924, pp. 7–11, 6 figs. Superpower plant at St. Louis constitutes study in material handling; summary of principal equipment.

Cahokia Station, Union Electric Light & Power Company, St. Louis, Mo. Power, vol. 59, no. 14, Apr. 1, 1924, pp. 514–524, 15 figs. Uses pulverized fuel; preparation plant in same building as boilers and flue gases utilized to dry coal; each section of station containing 2 turbo-generators and 8 boilers is independent unit; steam pressure 300 lb.,t emperature 690 deg., natural draft, no economizers.

Saxton, Pa. Saxton Plant of the Penn Central Light & Power Company, A. Iddles. Power, vol. 59, no. 16, Apr. 15, 1924, pp. 592–599, 11 figs. Minemouth station designed for ultimate capacity of 100,000 kw.; first section 20,000 kw. installed; boilers equipped with economizers; house turbine and low-pressure evaporators; load on house turbine automatically controlled by temperature of boiler feedwater; data on principal equipment.

Switzerland. Statistical Data from Electricity Works in Switzerland for 1922 (Einige zusammenfassende Angaben aus der Statistik der Elektrizitätswerke der Schweiz für das Jahr 1922). Schweiz. Elektrotechnischer Verein—Bul., vol. 15, no. 2, Feb. 1924, pp. 64–67. Preliminary results of statistics now being compiled on power plants of Switzerland; comparison with statistics for 1919.

Water Power vs. Steam Power. Water Power Compared with Steam Power and Their Relation to Rural Service, G. C. Neff. Nat. Elec. Light Assn. Bul., vol. 11, no 3, Mar. 1924, pp. 152–154. States that only comparatively few of the hydroelectric stations of United States can successfully compete in low cost of generation with large modern well-located steam plants of today. Excerpts of address before Agricultural College of Univ. of Wis.

CHARTS

Nomograms. Applications of a Type of Nomogram with Rectilinear Scales (Quelques applications d'un type de nomogramme à échelles rectilignes), J. Hak. Annales des Ponts & Chaussées, vol. 93, no. 6, Nov.—Dec. 1923, pp. 375–386, 5 figs. Describes methods of application.

COAL

Heat, Effect on. Quantity and Nature of Gas Evolved by Solid Fuels under the Action of Heat or of a Vacuum: Coals (Sur la quantité et la nature des gaz dégagés par les combustibles solides sous l'action de la chaleur et du vide: Houilles), P. Lebeau. Académie des Sciences—Comptes Rendus, vol. 178, no. 4, Jan. 21, 1924, pp. 391–393. Study of effect of heat on ten different kinds of coal; gaseous evolution in all cases becomes rapid at 400 deg. (1 to 5 cu. m. per metric ton); most coals give, per metric ton, 15 kg. of hydrogen, anthracite giving 25 kg.

Heating Values. The Calorific Values of Coals, with Special Reference to the Coals of Nottinghamshire and Derbyshire, J. W. Whitaker. Colliery Guardian, vol. 127, no. 3299, Mar. 21, 1924, pp. 734–737, 6 figs. Results of analyses and calorific values of 38 samples of coal. Paper read before Midland Counties Inst. Engrs. See also Iron & Coal Trades Rev., vol. 108, no. 2924, Mar. 14, 1924, pp. 427–428, 1 fig.

COAL HANDLING

Locomotive Plants. Locomotive Coaling Plant Recently Installed by the Italian State Railway, G. F. Zimmer. Indus. Mgt. (Lond.), vol. 11, no. 5, Mar. 6, 1924, pp. 133–135, 2 figs. Describes installation of stationary type, built entirely of mild steel, erected in duplicate, one at Foggia and one at Rimini, embodying latest developments of its type.

Sizing. The Sizing of Small Coal, Thos. Fraser. Coal Industry, vol. 7, nos. 2 and 3, Feb. and Mar. 1924, pp. 89–91 and 121–124. New conditions in sizing small fuel which have arisen; special shaker screens for small coal and coke; vibrating screens.

COAL STORAGE

Concrete Bins. Concrete Coal Bunkers, F. Dawson. Eng. & Boiler House Rev., vol. 39, no. 9, Apr. 1924, pp. 313–314, 2 figs. Leading features of reinforced-concrete construction. Notes on recent contract placed by Lond. County Council for new coal bunkers at Greenwich.

Losses. The Storage of Bituminous Coal, W. Seymour. Eng. Jl., vol. 7, no. 4, Apr. 1924, pp. 183–185, 4 figs. Losses which may occur in storage coal and proposed remedies.

COMPRESSED AIR

Improvements. Improvements in Compressed-Air Practice (Neuerungen im Pressluftbetrieb). Schiffbau, vol. 25, no. 10, Feb. 27, 1924, pp. 230–233, 8 figs. Improvements in compressors of small and medium output constructed by Frankfurt Maschine-Building Corp.; improvements in compressed-air piping, and in pneumatic tools.

CONDENSERS, STEAM

Tubes. Manufacture of Condenser Tubes, W. R. Webster. Iron Age, vol. 113, no. 12, Mar. 20, 1924, pp. 871–872. How non-ferrous castings of hollow cylinders are transformed into tubes. Composition and heat treatment. Abstract of paper read before Metropolitan Sec. of A.S.M.E.

Unit Heat-Transfer Determination. Condenser Unit Heat Transfer Obtained from Chart, H. O. Michael. Power, vol. 59, no. 13, Mar. 25, 1924, pp. 488–489, 1 fig. Gives chart with which operating engineer may very quickly learn condition of condenser, and explains its use. Based on general principle that all central stations and other well-regulated plants maintain a fairly constant steam pressure and temperature; because of this, B.t.u. rejected to condensers per lb. of steam is nearly constant, varying slightly with vacuum.

CONNECTING RODS

Machining. Hollow Connecting Rods in the Making, F. H. Colvin. Am. Mach., vol. 60, nos. 9 and 10, Feb. 28 and Mar. 6, 1924, pp. 311–313 and 351–352, 16 figs. Feb. 28: Operations on connecting rods for Wright airplane engines; fixtures and methods for securing light weight, accuracy and ample strength. Mar. 6: Construction of inner rod and methods by which it is machined.

CONVEYORS

Cotton Mill. A Conveyor System that Revolutionized a Cotton Mill, Rob. T. Kent. Mgt. & Administration, vol. 7, no. 4, Apr. 1924, pp. 411–416, 9 figs. Mechanical handling methods at Jackson Mills at Nashua, N. H.; system is designed to handle entire product from raw cotton to finished cloth with exception of movement between one or two operations, where hand labor is more economical.

COOLING TOWERS

Reinforced-Concrete. The Dimensioning of Reinforced-Concrete Cylindrical Cooling Tower Walls (Bemessung von zylinderförmigen Kühlturmwänden aus Eisenbeton), E. Rausch. Deutsche Bauzeitung, vol. 57, no. 102–103, Dec. 22, 1923, pp. 117–120, 3 figs. Influence of wind forces and temperature; combined effect of wind and temperature stresses; practical example.

COST ACCOUNTING

Capital Control. Capital Requirements and Control, J. H. Bliss. Mgt. & Administration, vol. 7, no. 4, Apr. 1924, pp. 405–410. Control of fixed property investments.

Costs and Inventory Records. Combined Record System for Costs and Inventory, Wm. L. Myles. Am. Mach., vol. 60, no. 16, Apr. 17, 1924, pp. 575–578, 6 figs. All records of labor and material kept in visible index; description of forms; how costs are determined; purchasing index and payroll statistics.

Depreciation. A Statistical Theory of Depreciation, Based on Unit Cost, J. S. Taylor. Mass. Inst. Technology—Pub., Dept. of Mathematics, Series 2, no. 71, Feb. 1924, pp. 1010–1023. Discusses methods of treating depreciation, dealing with "useful life" of machine, or number of years property will be used, and how depreciation charges are to be distributed over period of use. Reprinted from Am. Statistical Assn., Dec. 1923.

COUPLINGS

Compression. Making Couplings for Transmission of Power, H. P. Armson. Can. Machy., vol. 31, no. 13, Mar. 27, 1924, pp. 19–21, 3 figs. Shop methods and tools in plant of Bond Eng. Works, Toronto, Can., for machining double tapered sleeves and inner and outer shells for compression couplings.

CRANES

Balance-Weight Determination. Determination of Additional Weight—Ballast and Balance Weight—in Curb-Ring Cranes (Bestimmung des Zusatzgewichtes—Ballast und Gegengewicht—bei Drehscheibenkranen), W. Hilge. Fördertechnik u. Frachtverkehr, vol. 17, no. 3, Feb. 3, 1924, pp. 29–31, 3 figs. Gives simple method for determining additional weight as the only possible minimum; by this means production and freight are rendered cheaper; current supply of slewing motor is reduced, and control of crane is made easier.

Double. Double Cranes in Port of Hamburg. Port & Terminal, vol. 4, no. 2, Mar. 1924, p. 20. Particulars of new crane, put out by Deustche Maschinenfabrik A. G., Duisburg (Demag), for cargo handling; constructed along new lines, represents a combination in the building of two different types of cranes.

Uses. Industrial Cranes and Their Varied Uses, M. W. Potts. Indus. Mgt. (N. Y.), vol. 67, no. 4, Apr. 1924, pp. 216–223, 12 figs. Discusses different ways in which cranes can be of service; classifications for cranes.

CRANKCASES

Aluminum, Molding. Central European Practice, C. Irresberger. Foundry, vol. 52, no. 7, Apr. 1, 1924, pp. 258–262, 15 figs. Aluminum crankcases molded with chills and lugs to neutralize shrinkage effects; molding practice; castings cleaned by sand blast and tested for porosity by brushing with gasoline.

CRANKSHAFTS

Balancing. Practical Balancing of a V-Type Engine Crankshaft, D. E. Anderson. Soc. Automotive Engrs.—Jl., vol. 14, no. 4, Apr. 1924, pp. 409—414, 10 figs. Practical methods devised to accomplish results desired; describes how selection of parts to obtain equal weights is made; combination static and dynamic balancing machine that can be set for either operation is used for balancing crankshaft; method of testing completed work.

Elastic Couplings, Influence of. Influence of Harmonics of Phase Retardation on Arrangement of Cranks in a Multiple-Cylinder Explosion Engine (Influence des harmoniques des retards de phase sur la répartition des manivelles dans un moteur à explosion à cylindres multiples), A. Blondel. Académie des Sciences—Comptes Rendus, vol. 178, no. 4, Jan. 21, 1924, pp. 354–359. Investigation of influence of elastic couplings and damping; it is shown that use of elastic couplings necessitates closer examination of conditions of resonance and damping of multiple crankshafts.

CUPOLAS

Control Records. Records Show Cupola Control, S. J. Pelton. Foundry, vol. 52, no. 7, Apr. 1, 1924, pp. 255–257, 6 figs. Constant personal check must be kept on materials and methods, otherwise records are liable to have little value; scales and weighing methods require particular attention.

Slagging Operations. Slagging Operations in Cupola Practice, H. H. Shepherd. Metal Industry (Lond.), vol. 24, nos. 11 and 12, Mar. 14 and 21, 1924, pp. 259–261 and 283–284. Object of slagging; slagging reactions; amounts of flux to use; composition of good limestone for fluxing; sulphur absorption; cupola slags.

CUTTING METALS

City Gas, Use of. Use of City Gas for Cutting Steel, J. H. Gumz. West. Machy. Wld., vol. 15, no. 3, Mar. 1924, pp. 85–87, 9 figs. Results of tests made to determine cost of city gas cutting.

CYLINDERS

Casting. The Cylinder Problem, O. Smalley. Foundry Trade Jl., vol. 29, nos. 392, 393 and 394, Feb. 21, 28 and Mar. 6, 1924, pp. 147–151, 173–177 and 195–197, 26 figs. Cause and elimination of the commoner defects encountered in manufacture of cylinder castings. Paper read before Inst. British Foundrymen and North East Coast Instn. Engrs. & Shipbldrs.

Lubrication. Cylinder Lubrication When Using Saturated and Superheated Steam, J. D. Morgan. Power, vol. 59, no. 16, Apr. 15, 1924, p. 607. Atomization of oil basic requirement in steam-cylinder lubrication; using low flash-point oils; lubrication of special engines.

D

DIESEL ENGINES

Camellaird-Fullagar. British Yard Builds Largest Marine Diesel Engine. Mar. Eng., vol. 29, no. 4, Apr. 1924, pp. 238–240 and 242, 3 figs. Particulars of 6-cylinder Camellaird-Fullagar opposed-piston engine developing 3000 b.hp. at 90 r.p.m., built by Palmers Shipbldg. & Iron Co.

Double-Acting. Double-Acting Diesel of Unique Design. Motorship, vol. 9, no. 4, Apr. 1924, pp. 261–263, 5 figs. How North British 200 s.hp. unit differs from all other 2-cycle double-acting marine oil engines.

Fairfield-Sulzer. Fairfield-Sulzer Engines for the Union Steam Ship Company of New Zealand Ltd. Shipbldg. & Shipg. Rec., vol. 23, no. 12, Mar. 20, 1924, p. 333. Particulars of engines to be installed in a new motor passenger liner, the Aorangi; four sets of Fairfield-Sulzer Diesel engines each having six cylinders 27½ in. diameter by 39-in. stroke, working on 2-stroke cycle; 16,000 i.hp. on four shafts.

M. A. N. How the World's Largest Diesel Was Built, Fred. Englert. Motorship, vol. 8, no. 12, Dec. 1923, pp. 848–849 and vol. 9, nos. 1, 2 and 3, Jan., Feb. and Mar. 1924, pp. 40–41, 119 and 185–187, 12 figs. Relates most serious problems which faced engineers of M. A. N.'s plant, Nürnberg, in bringing to practical state highest-powered Diesel engine ever constructed, developing over 17,000 s.hp.

The High-Power Diesel Engine of Nürnberg, W. Laudahn. Power, vol. 59, nos. 16 and 17, Apr. 15 and 22, 1924, pp. 603–606 and 642–644, 8 figs. Discussion of difficulties met with in designing 12,000-hp. Diesel engine; account of explosion that wrecked engine. Translated from Zeit. des Vereines Deutscher Ingenieure, Dec. 8, 1923.

Maintenance and Care. The Maintenance and Care of Diesel Engines, O. Olson. Mar. Eng. & Shipg. Age, vol. 29, no. 3, Mar. 1924, pp. 169–170. Practical notes on operation of Diesel engines, compressors and motorship auxiliaries.

Power Plants, Use in. Diesel Engines as Economical Power Producers, J. Ander. Power House, vol. 17, no. 6, Mar. 20, 1924, pp. 30–31, 1 fig. Data on Diesel engine plants and operating cost of same under Canadian conditions. Serious competitor of hydroelectric power.

Two-Stroke-Cycle Application. Present-Day Diesel Engines—Application of the Two-Stroke-Cycle Principle, Nagal. Power, vol. 59, no. 14, Apr. 1, 1924, pp. 526–527, 3 figs. Extract of paper read before Verein Deutscher Ingenieure, June 20, 1923, at Berlin.

Valves. Valves of Diesel Engines, F. Johnstone-Taylor. Gas & Oil Power, vol. 19, no. 222, Mar. 6, 1924, pp. 97–98, 3 figs. Practical advice on their care and maintenance.

Manufactured by Advertisers

CLASSIFIED LIST OF MECHANICAL EQUIPMENT

Alphabetical List on page 156

Engines, Steam, Automatic
* American Blower Co.
* Clarage Fan Co.
* Engberg's Electric & Mech. Wks.
* Erie City Iron Works
* Harrisburg Fdry. & Mach. Wks.
* Leffel, James & Co.
Ridgway Dynamo & Engine Co.
* Skinner Engine Co.
* Sturtevant, B. F. Co.
* Troy Engine & Machine Co.
* Westinghouse Electric & Mfg. Co.

Engines, Steam, Corliss
* Allis-Chalmers Mfg. Co.
* Franklin Machine Co.
* Frick Co. (Inc.)
* Harrisburg Fdry. & Mach. Wks.
Mackintosh-Hemphill Co.
* Nordberg Mfg. Co.
* Vilter Mfg. Co.

Engine, Steam, High Speed
* American Blower Co.
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* Engberg's Electric & Mech. Wks.
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* Harrisburg Fdry. & Mach. Wks.
* Nordberg Mfg. Co.
Ridgway Dynamo & Engine Co.
* Skinner Engine Co.

Engines, Steam, Poppet Valve
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* Nordberg Mfg. Co.
Ridgway Dynamo & Engine Co.
* Vilter Mfg. Co.

Engines, Steam, Throttling
* American Blower Co.
* Clarage Fan Co.
* Engberg's Electric & Mech. Wks.
Ridgway Dynamo & Engine Co.

Engines, Steam, Una-Flow
* Frick Co. (Inc.)
* Harrisburg Fdry. & Mach. Wks.
* Nordberg Mfg. Co.
Ridgway Dynamo & Engine Co.
* Skinner Engine Co.

Engines, Steam, Variable Speed
* American Blower Co.
* Harrisburg Fdry. & Mach. Wks.
* Nordberg Mfg. Co.
Ridgway Dynamo & Engine Co.

Engines, Steam, Vertical (Fully Enclosed, Self-Oiling)
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* Clarage Fan Co.
* Engberg's Electric & Mech. Wks.
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Engines, Steering
Bethlehem Shipbldg.Corp'n (Ltd.)
Lidgerwood Mfg. Co

Evaporators
Bethlehem Shipbldg.Corp'n (Ltd.)
* Croll-Reynolds Engrg. Co. (Inc.)
Farrel Foundry & Machine Co.
* Vogt, Henry Machine Co.
* Wheeler Condenser & Engrg. Co.

Excavating Machinery
Clyde Iron Works Sales Co.
Lidgerwood Mfg. Co.
Link-Belt Co.

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Exhaust Systems
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* Clarage Fan Co.
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* General Electric Co.
* Green Fuel Economizer Co.
* Schutte & Koerting Co.
* Sturtevant, B. F. Co.

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Fletcher Works
Tolhurst Machine Works

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* Kieley & Mueller (Inc.)

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* Clarage Fan Co.
* Coppus Engineering Corp'n
* General Electric Co.
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Fans, Exhaust, Mine
* American Blower Co.
* Sturtevant, B. F. Co.

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Reed Air Filter Co. (Inc)

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Filters, Feed Water, Demulsifying
* Permutit Co.

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Nugent, Wm. W. & Co. (Inc.)
* Permutit Co.

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Filters, Water
* Cochrane Corp'n
Elliott Co.
* Graver Corp'n
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* Scaife, Wm. B. & Sons Co.

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* Graver Corp'n
International Filter Co.
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(See Brick, Hydrants, Fire, etc.)

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(Reading Valve & Fittings Div.)
Steere Engineering Co.
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* Crane Co.
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Lunkenheimer Co.
* Pittsburgh Valve, Fdry. & Const. Co.
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* Pittsburgh Valve, Fdry. & Const. Co.
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Flanges, Forged Steel
Cann & Saul Steel Co.

Floor Armor
* Irving Iron Works Co.

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* Crane Co.
Hill Clutch Mach. & Fdry. Co.
* Jones, W. A. Fdry. & Mach. Co.
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* Vogt, Henry Machine Co.

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Cann & Saul Steel Co.

Forgings, Iron and Steel
Cann & Saul Steel Co

Foundry Equipment
* Whiting Corp'n

Friction Clutches, Hoists, etc.
(See Clutches, Hoists, etc., Friction)

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Rockwood Mfg. Co.

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(See Economizers, Fuel)

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* Detroit Stoker Co.
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* O'Brien, John Boiler Works Co.

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Detroit Electric Furnace Co.
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Furnaces, Melting
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* Detroit Stoker Co.
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Fuses
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* Ashton Valve Co.
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Gage Glasses
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Sesure Water Gauge Co.

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* American Schaeffer & Budenberg Corp'n
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* Ashton Valve Co.
* Crosby Steam Gage & Valve Co.
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Bacharach Industrial Instrument Co.
* Bailey Meter Co.
* Tagliabue, C. J. Mfg. Co.
* Uehling Instrument Co.

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* Ashton Valve Co.
Bacharach Industrial Instrument Co.
* Bailey Meter Co.
* Bristol Co.
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* Taylor Instrument Cos.
* Uehling Instrument Co.

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* Ashton Valve Co.
Bacharach Industrial Instrument Co.
* Bailey Meter Co.
* Bristol Co.
* Crosby Steam Gage & Valve Co.
* Tagliabue, C. J. Mfg. Co.
* Uehling Instrument Co.

Gages, Rate of Flow
Bacharach Industrial Instrument Co.
* Bailey Meter Co.
* Builders Iron Foundry
* Simplex Valve & Meter Co.

Gages, Syphon
* Tagliabue, C. J. Mfg. Co.

Gages, Vacuum
* American Schaeffer & Budenberg Corp'n
* Ashton Valve Co.
Bacharach Industrial Instrument Co.
* Bristol Co.
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* Tagliabue, C. J. Mfg. Co.
* Taylor Instrument Cos.
* Uehling Instrument Co.

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Smooth-On Mfg. Co.

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* United States Rubber Co.

*Catalogue data of firms marked * appear in the A.S.M.E. Condensed Catalogues of Mechanical Equipment, 1923-24 Volume*

Water-Works. Oil Engines that Have Seen Long Water-Works Service J. H. Bender. Fire & Water Eng., vol. 75, no. 11, Mar. 12, 1924, pp. 495–496 and 513, 3 figs. Record of three units installed in Clayton, N. M. in 1911, 1912 and 1917 respectively, which have given good satisfaction, demonstrating reliability of this type of motive power.

DRAWINGS

Tool-Drafting Records. Tool Engineering, A. A. Dowd and F. W. Curtis. Am. Mach., vol. 60, no. 16, Apr. 17, 1924, pp. 591–593, 4 figs. Records necessary in tool-drafting room; time and progress records; supervision of drafting room.

DRILLING MACHINES

Types. Plate and Bar-working Tools. Machy. (Lond.), vol. 23, nos. 596 and 598, Feb. 28 and Mar. 13, 1924, pp. 713–718 and 777–784, 34 figs. Drilling machines and practice.

DYNAMOMETERS

Torsion. The Amsler Torsion Dynamometer with Stroboscopic Reading Device (Dynamomètre de torsion, système Amsler, avec dispositif de lecture stroboscopique). Génie Civil, vol. 84, no. 11, Mar. 15, 1924, pp. 260–261, 2 figs. Apparatus for measuring power absorbed by high-speed machines forced to overcome an almost constant resistance.

E

EDUCATION, INDUSTRIAL

Machinists. Can a School Turn Out First-class Machinists? C. O. Herb. Machy. (N. Y.), vol. 30, no. 8, Apr. 1924, pp. 622–625, 4 figs. Methods followed in machine shop of Worcester Boys Trade School, Worcester, Mass., run on a commercial basis; describes shop work courses.

ELECTRIC FURNACES

Acid. More Electric Steel in South. Foundry, vol. 52, no. 8, Apr. 15, 1924, pp. 312–315, 8 figs. Also Iron Trade Rev., vol. 74, no. 14, Apr. 3, 1924, pp. 913–916, 8 figs. New Orleans company specializing in sugar-mill machinery installs acid electric furnace to make railroad castings; metallurgical control insures uniform quality of metal poured.

Iron-Ore Reduction. Electric Reduction Furnace Iron, R. C. Gosrow. Iron Trade Rev., vol. 74, no. 15, Apr. 10, 1924, pp. 982–983 and 991. States that pig iron made in electric reduction is of high quality and adapted to foundry and steelmaking use.

ELECTRIC LOCOMOTIVES

Measurement Car for. Measurement Car for the Investigation of Electric Locomotives (Der Messwagen zur Untersuchung elektrischer Lokomotiven), Kleinow. Glasers Annalen, vol. 94, no. 5, Mar. 1, 1924, pp. 53–57, 10 figs. Describes car of the German State Railway fully equipped for investigation of electric locomotives: details of design, measuring instruments, and results.

Single-Phase. 2-C-1 Single-Phase Electric Locomotive with Individual Drive. Engineer, vol. 137, no. 3562, Apr. 4, 1924, p. 369–371, 6 figs. partly on p 362. New locomotives built by Brown, Boveri & Co., in which each of driving axles have independent motors; gearing is fitted on one side of engine and driving wheels on oposite side are free.

1-C-1 Electric Locomotives of the Swiss Federal Railway (Les locomotives électriques type 1-C-1 des Chemins de fer fédéraux), E. Savary. Bul. Technique de la Suisse Romande, vol. 5, no. 3, Feb. 1924, pp. 25–29, 9 figs. partly on supp. plate. Principal features and advantages of single-phase locomotives with individual axle drive, built by Sécheron Works, Geneva.

ELECTRIC RAILWAYS

Cars, Safety. New Safety Cars for Ontario Hydro Electric Railways. Ry. Signaling, vol. 17, no. 4, Apr. 1924, pp. 184–185, 2 figs. Details of 400-class cars, which will be equipped for multiple-unit operation.

Switzerland-Italy. Domodossola to Locarno, via the Centovalli. Ry. Gaz., vol. 40, no. 12, Mar. 21, 1924, p. 415, 2 figs. New electric mountain railway of narrow gage, 51 km. long.

ELECTRIC WELDING, ARC

Precision. The Electric Arc in Precision Welding, S. W. Mann. Forging-Stamping-Heat Treating, vol. 10, no. 2, Feb. 1924, pp. 68–71, 3 figs. Flexibility of electric arc welding makes it possible to repair a broken shaft or casting to same degree of strength and accuracy as before failure.

Rail Joints. Rail Welding in Connecticut. Elec. Ry. Jl., vol. 63, no. 14, Apr. 5, 1924, pp. 537–539, 2 figs. Improvements in carbon arc welded rail joints adopted by Connecticut Co.; tilted joint plate and base plate adapted to 23 different rail sections; precautions adopted to secure good welds.

ELECTRIC WELDING, RESISTANCE

Seam Welders. Various Types of Electric Seam Welders, J. R. Brueckner. Forging—Stamping—Heat Treating, vol. 10, no. 3, Mar. 1924, pp. 107–109. Discusses development of automatic spot welder, continuous seam welder, roll-step method of seam welding, and seam welding using interrupted current, and merits of each method.

EMPLOYEES, TRAINING OF

Coöperative Education. Training the Future Employee Through Coöperative Education, H. H. Bliss. Jl. of Electricity, vol. 52, no. 6, Mar. 15, 1924, pp. 205–206. Describes plan which is being widely adopted in the West, in which firms coöperate with college in training future leaders of industry; includes alternate monthly periods of study and employment, coördinated so that work serves practically as laboratory part of a unified course of training.

EMPLOYMENT MANAGEMENT

Promotion Policy. Reducing Labor Turnover by Promotion, K. H. Condit. Am. Mach., vol. 60, no. 15, Apr. 10, 1924, pp. 539–541, 2 figs. Seventh article in Gilbreth series describing personnel policy; doing away with blind-alley jobs; helping employee to reach highest position he can hold.

Selecting Foundry Molders. Picking Competent Molders, R. J. Waldo. Foundry, vol. 52, no. 8, Apr. 15, 1924, pp. 307–309, 3 figs. Exacting methods for determining applicant's fitness to fulfill position recognized as desirable; trade test method of interviewing prospective employees successful in choosing men for foundry work.

ENGINEERS

Relation to Finance. The Engineer's Relation to Finance, L. W. Mayer. Min. & Metallurgy, vol. 5, no. 208, Apr. 1924, pp. 163–167. Why engineering profession does not rank higher; confidence in engineer held by banker; points out that there are more failures owing to poor financing than to poor engineering, and that financier underestimates degree of engineer's assistance.

EVAPORATION

Heat of. Heat of Vaporization, A Function of the Temperature, M. W. Green. Am. Chem. Soc.—Jl., vol. 46, no. 3, Mar. 1924, pp. 544–545. Calculation devised to show that if heat of vaporization is assumed to be function of temperature alone, the same function for all substances but differing in constants involved, conclusion is arrived at which indicates approximate limits of accuracy of such relation.

EVAPORATORS

Continuous-Flow. The Continuous Flow Evaporator, M. C. Stuart. Am. Soc. Nav. Engrs.—Jl., vol. 36, no. 1, Feb. 1924, pp. 55–65, 7 figs. Describes new evaporator, design of which embodies novel features directed toward improvement in purity, capacity, economy and operation.

F

FABRICS

Wear-Testing Machine. A Machine for Investigating the Resistance of Fabrics to Abrasion ("Wear"), Rob. P. Ethridge. Testing, vol. 1, no. 2, Feb. 1924, pp. 156–159, 2 figs. Principle of design of cloth wear-testing machine.

FANS

Drives. The Argument for the Slow-Speed Direct-Connected D. C. Motor for Ventilating Fan Drive, J. L. McK. Yardley. Heat. & Vent. Mag., vol. 21, no. 4, Apr. 1924, pp. 43–46, 10 figs. How motor ratings have increased; limit reached in reductions of speed of a.c. motors; transforming a.c. to d.c.

FIRE FIGHTING

Fire-Escape Ladder. A New Motor Turntable Fire Escape. Motor Transport (Lond.), vol. 38, no. 995, Mar. 24, 1924, pp. 353–354, 5 figs. Describes ladder, all movements of which are controlled by hydraulic power; mounted on a Merryweather standard 65-hp. chain-driven chassis and embodying latest design of Merryweather escape ladder and trussing.

FLIGHT

Gliding. Difference between the Piloting of Gliders and Motor Airplanes from the Standpoint of the Practical Glider Pilot (Unterschied zwischen der Führung von Segel- und Motorflugzeugen vom Standpunkt des praktischen Segelfliegers), H. Hackmack. Zeit. für Flugtechnik u. Motorluftschiffahrt, vol. 15, no. 1–2, Jan. 26, 1924, pp. 2–3. Offers practical suggestions for motorless flight.

Gliding Flight (Le vol à voile), H. Liurette. Vie Technique & Industrielle, vol. 6, no. 52, Jan. 1924, pp. 234–240, 20 figs. Mechanism of gliding flight; influence of weight on speed; laboratory experience; internal energy of a bird against internal energy of wind.

Gliding Flight against the Wind (Sur le vol à voile contre le vent), A. Rateau. Académie des Sciences—Comptes Rendus, vol. 178, no. 3, Jan. 14, 1924, pp. 280–285, 1 fig. Author demonstrates that Katzmayr effect can be deduced immediately from what is already known of wing characteristics in fixed regular current; formula obtained gives principal laws of Katzmayr effect.

FORGINGS

Steel. Recent Developments in Steel Forgings, J. L. Cox. Forging—Stamping—Heat Treating, vol. 10, nos. 1 and 2, Jan. and Feb. 1924, pp. 12–16 and 87–89, 23 figs. Review of developments in line of forging exceptionally large machine parts; forgings often employed to advantage in place of steel castings. Paper read before Am. Iron & Steel Inst., Oct. 1923.

FOUNDING

Automobile. Modern Automobile Foundry Practice, P. Pritchard. Foundry Trade Jl., vol. 29, nos. 392, 393, 394 and 395, Feb. 21, 28, Mar. 6 and 13, 1924, pp. 158–161, 169–172, 191–194 and 215–218, 33 figs. Also Automobile Engr., vol. 14, no. 187, Mar. 1924, pp. 84–91, 22 figs. Underlying principles; sand molds; molding machines; aluminum, its melting and molding, and defects which have to be overcome in founding; aluminum die-casting; cast iron, its melting and molding; coremaking; cylinder casting; mild steel castings; non-ferrous foundry practice; etc. Paper read before Instn. Automobile Engrs.

FOUNDRIES

Cost-Distribution System. Distribute Costs on Each Job, E. C. Boehringer. Foundry, vol. 52, no. 6, Mar. 15, 1924, pp. 207–212, 11 figs. Nugent Steel Castings Co., Chicago, Manufacturers of electric-steel castings make detailed tabulation of expenses including minor materials to each job; how work is routed through shop.

Metal Melting, Fuels for. Melting by Natural-Draught Gas and Other Fuels, A. J. Smith. Brass Wld., vol. 20, no. 3, Mar. 1924, pp. 93–94. Results obtained in foundries with different fuels.

Steel, Cost System for. Distributing Costs on Each Job, E. H. Boehringer. Iron Trade Rev., vol. 74, no. 13, Mar. 27, 1924, pp. 853–857, 12 figs. Describes elaborate, yet not burdensome, cost system developed by Nugent Steel Castings Co., Chicago, Ill., whereby it keeps before it at all times a running and complete picture of all its cost factors; is controlling factor through plant from unloading of steel scrap to shipment of finished casting.

FOUNDRY EQUIPMENT

Core and Sand Testing Equipment. Molds, Cores and Molding Sands (Ueber Formen, Kerne und Formsande), L. Treuheit. Giesserei-Zietung, vol. 20, no. 25, Dec. 1, 1923, pp. 483–492, 30 figs. Strength-testing apparatus for molds and cores; a new decanting apparatus for molding sands; evaluation of molding sands.

Flask Design. Principles in Cast Iron Flask Design, H. Cohen. Iron Age, vol. 113, no. 16, Apr. 17, 1924, pp. 1137–1140, 7 figs. Applications to jarring machine work on gray iron; general rules as to bars; core weights and supports; internal strains.

FREIGHT HANDLING

Containers, Demountable. Container Units in Motor Truck Freight Service. Ry. Rev., vol. 74, no. 14, Apr. 5, 1924, pp. 656–658, 4 figs. How Detroit United Ry. has developed new equipment to establish auxiliary motor-truck service, consisting of demountable unit container equipment.

L. C. L. by Motor Truck. Delivering Less-Than-Carload Freight by Motor Truck, R. D. Sangster. Soc. Automotive Engrs.—Jl., vol. 14, no. 4, Apr. 1924, pp. 415–421. Outline of practical working of St. Louis system, demonstrating regard in which it is held by both shipper and carrier; adaptability of system to store-door delivery; advantages of off-track freight stations; Harlan plan for Manhattan Island.

FUELS

See COAL; OIL FUEL; PULVERIZED COAL.

FURNACES, GAS

Specific Heat of Combustion Products. Specific Heats of Products of Combustion from Gas Furnaces, L. E. Biemiller. Gas Age-Rec., vol. 53, no. 14, Apr. 5, 1924, pp. 423–425, 1 fig. Determination of specific-heat values; review of previous work on the subject, and calculations.

FURNACES, HEATING

Continuous Pair. Pair Heating, Wm. C. Buell, Jr. Blast Furnace & Steel Plant, vol. 12, nos. 2, 3 and 4, Feb. Mar. and Apr. 1924, pp. 122–123, 159–160 and 180–182, 3 figs. Resume of conditions surrounding present practice in heating sheet bars; describes heating furnace of new design and employing two-stage combustion; analysis of heating costs.

FURNACES, HEAT-TREATING

Recuperative. Heat-Treating Furnaces Using Recuperation, P. J. Nutting. Iron Age, vol. 113, no. 16, Apr. 17, 1924, pp. 1156–1157, 2 figs. Effect of pre-heating air, using coal, oil or other fuels; applications to annealing and carburizing.

FURNACES, HOT-AIR

Gas-Fired. Making Progress with the Hot Air Furnace. Gas Age-Rec., vol. 53, no. 15, Apr. 12, 1924, pp. 473–474, 5 figs. Particulars of furnace developed by Rochester Gas & Elec. Corp., entirely automatic, being equipped with a humidostat as well as a thermostat; heat loss to chimney is low, as gases pass off at 170 deg. fahr. as against 300 to 500 deg. fahr. in coal-fired furnaces.

G

GAGES

Checking System. Systematic Gage-Checking as a Requisite of Precise Measurement, Jos. Lannen. Soc. Automotive Engrs.—Jl., vol. 14, no. 4, Apr. 1924, pp. 407–408. Details of methods employed in creating and maintaining gage-checking system, and statement in reference to equipment used and good results attained.

Pressure. Modern Recording Pressure Gauges. Eng. Progress, vol. 5, no. 2, Feb. 1924, pp. 26–27, 4 figs. Describes design of recording instruments which permit control of constancy of pressure by means of graph produced by apparatus during certain interval of time.

Sine Bar. A Sine-bar Angle Gage for Commutator Work, Wm. Crozier. Machy. (Lond.), vol. 23, no. 598, Mar. 13, 1924, pp. 767–768, 5 figs. Describes sine-bar angle gage designed by author for motor commutators.

Manufactured by Advertisers **CLASSIFIED LIST OF MECHANICAL EQUIPMENT** Alphabetical List on page 156

Gates, Blast
* American Blower Co.
Steere Engineering Co.

Gates, Cut-off
Easton Car & Construction Co.
Link-Belt Co.

Gates, Sluice
* Chapman Valve Mfg. Co.
* Pittsburgh Valve, Fdry. & Const. Co.

Gear Blanks
Cann & Saul Steel Co.

Gear Cutting Machines
* Jones, W. A. Fdry. & Mach. Co.

Gear Hobbing Machines
* Jones, W. A. Fdry. & Mach. Co.

Gears, Bakelite
Ganschow, Wm. Co.
Nuttall, R. D. Co.

Gears, Bronze
Nuttall, R. D. Co.

Gears, Cut
* Brown, A. & F. Co.
Chain Belt Co.
Hill Clutch Machine & Fdry. Co.
* De Laval Steam Turbine Co.
Farrel Foundry & Machine Co.
* Fawcus Machine Co.
* Foote Bros. Gear & Machine Co.
* James, D. O. Mfg. Co.
Johnson, Carlyle Machine Co.
* Jones, W. A. Fdry. & Mach. Co.
Link-Belt Co.
Mackintosh-Hemphill Co.
* Medart Co.
Nuttall, R. D. Co.
Philadelphia Gear Works

Gears, Fibre
* General Electric Co.
* James, D. O. Mfg. Co.
Nuttall, R. D. Co.

Gears, Grinding
Farrel Foundry & Machine Co.

Gears, Helical
Farrel Foundry & Machine Co.
Nuttall, R. D. Co.

Gears, Herringbone
* Falk Corporation
Farrel Foundry & Machine Co.
* Fawcus Machine Co.
Nuttall, R. D. Co.

Gears, Machine Molded
* Brown, A. & F. Co.
Farrel Foundry & Machine Co.
* Jones, W. A. Fdry. & Mach. Co.
Link-Belt Co.

Gears, Micarta
* Westinghouse Elec. & Mfg. Co.

Gears, Rawhide
Farrel Foundry & Machine Co.
Ganschow, Wm. Co.
* James, D. O. Mfg. Co.
Nuttall, R. D. Co.
Philadelphia Gear Works

Gears, Speed Reduction
Chain Belt Co.
* De Laval Steam Turbine Co.
* Falk Corporation
Farrel Foundry & Machine Co.
* Fawcus Machine Co.
* Foote Bros. Gear & Machine Co.
Ganschow, Wm. Co.
* General Electric Co.
* James, D. O. Mfg. Co.
* Jones, W. A. Fdry. & Mach. Co.
* Kerr Turbine Co.
Link-Belt Co.
Nuttall, R. D. Co.
Palmer-Bee Co.
* Sturtevant, B. F. Co.
* Westinghouse Electric & Mfg. Co.

Gears, Steel
Hill Clutch Machine & Fdry. Co.
Nuttall, R. D. Co.

Gears, Worm
Chain Belt Co.
* Cleveland Worm & Gear Co.
* Fawcus Machine Co.
* Foote Bros. Gear & Machine Co.
Ganschow, Mm. Co.
* Gifford-Wood Co.
* James D. O. Mfg. Co.
* Jones, W. A. Fdry. & Mach. Co.
Link-Belt Co.
Nuttall, R. D. Co.

Generating Sets
* Allis-Chalmers Mfg. Co.
* American Blower Co.
* Clarage Fan Co.
* Coppus Engineering Corp'n
* De Laval Steam Turbine Co
* Engberg's Electric & Mech. Wks.
* General Electric Co.
* Kerr Turbine Co.
Ridgway Dynamo & Engine Co.
* Sturtevant, B. F. Co.
* Westinghouse Electric & Mfg. Co.

Generators, Electric
* Allis-Chalmers Mfg. Co.
* De Laval Steam Turbine Co.
* Engberg's Electric & Mech. Wks.
* General Electric Co.
* Nordberg Mfg. Co.
Ridgway Dynamo & Engine Co.
* Westinghouse Electric & Mfg. Co.

Governors, Air Compressor
* Foster Engineering Co.
* Mason Regulator Co.

Governors, Engine, Oil
* Nordberg Mfg. Co.

Governors, Engine, Steam
* Nordberg Mfg. Co.

Governors, Oil Burner
* Foster Engineering Co.
* Mason Regulator Co.

Governors, Pressure
* Tagliabue, C. J. Mfg. Co.

Governors, Pump
* Bowser, S. F. & Co. (Inc.)
* Edward Valve & Mfg. Co.
* Foster Engineering Co.
* Kieley & Mueller (Inc.)
* Mason Regulator Co.
Squires, C. E. Co.
* Tagliabue, C. J. Mfg. Co.

Governors, Steam Turbine
* Foster Engineering Co.

Governors, Water Wheel
* Worthington Pump & Machinery Corp'n

Granulators
* Smidth, F. L. & Co.

Graphite, Flake (Lubricating)
* Dixon, Joseph Crucible Co.

Grate Bars
* Casey-Hedges Co.
* Combustion Engineering Corp'n
* Erie City Iron Works
* Titusville Iron Works Co.
* Vogt, Henry Machine Co.

Grate Bars (for Overfeed and Underfeed Stokers)
Furnace Engineering Co.

Grates, Dumping
* Combustion Engineering Corp'n
* Titusville Iron Works Co.
* Vogt, Henry Machine Co.

Grates, Shaking
* Casey-Hedges Co.
* Combustion Engineering Corp'n
* Erie City Iron Works
* Springfield Boiler Co.
* Titusville Iron Works Co.
* Vogt, Henry Machine Co.

Grating, Flooring
* Irving Iron Works Co.

Grease Cups
(See Oil and Grease Cups)

Grease Extractors
(See Separators, Oil)

Greases
* Dixon, Joseph Crucible Co.
* Royersford Fdry. & Mach. Co.
Vacuum Oil Co.

Grinding Machinery
* Brown, A. & F. Co.
* Smidth, F. L. & Co.

Grinding Machinery, Knife
* American Machine & Foundry Co.

Grinding Machines, Chaser
* Landis Machine Co. (Inc.)

Grinding Machines, Floor
* Builders Iron Foundry
* Royersford Fdry. & Mach. Co.

Gun Metal Finish
* American Metal Treatment Co.

Hammers, Drop
* Franklin Machine Co.
* Long & Allstatter Co.

Hammers, Pneumatic
* Ingersoll-Rand Co.

Handles, Machine, Steel
Rockwood Sprinkler Co.

Hangers, Shaft
* Brown, A. & F. Co.
Chain Belt Co.
* Falls Clutch & Machinery Co.
Hill Clutch Machine & Fdry. Co.
* Jones, W. A. Fdry. & Mach. Co.
Link-Belt Co.
* Medart Co.
* Royersford Fdry. & Mach. Co.
* Wood's, T. B. Sons Co.

Hangers, Shaft (Ball Bearing)
* Hyatt Roller Bearing Co.
* S K F Industries (Inc.)

Hangers, Shaft (Roller Bearing)
* Hyatt Roller Bearing Co.
* Jones, W. A. Fdry. & Mach. Co.

Hard Rubber Products
* United States Rubber Co.

Hardening
* American Metal Treatment Co.

Heat Exchangers
* Croll-Reynolds Engineering Co.

Heat Treating
* American Metal Treatment Co.
Nuttall, R. D. Co.

Heaters, Feed Water (Closed)
Bethlehem Shipbldg.Corp'n (Ltd.)
* Croll-Reynolds Engineering Co.
* Erie City Iron Works
* Schutte & Koerting Co.
* Walsh & Weidner Boiler Co.
* Wheeler, C. H. Mfg. Co.
* Wheeler Cond. & Engrg. Co.
* Worthington Pump & Machinery Corp'n

Heaters, Feed Water, Locomotive (Open)
* Worthington Pump & Machinery Corp'n

Heaters, Oil
* Power Specialty Co.

Heaters and Purifiers, Feed Water, Metering
* Cochrane Corp'n

Heaters and Purifiers, Feed Water (Open)
* Cochrane Corp'n
Elliott Co.
* Erie City Iron Works
Hoppes Mfg. Co.
* Springfield Boiler Co.
* Wickes Boiler Co.
* Worthington Pump & Machinery Corp'n

Heating and Ventilating Apparatus
* American Blower Co.
* American Radiator Co.
* Clarage Fan Co.
* Sturtevant, B. F. Co.

Heating Specialties
* Foster Engineering Co.
* Fulton Co.

Heating Specialties, Vacuum
* Foster Engineering Co.

Hoisting and Conveying Machinery
* Brown Hoisting Machinery Co.
Chain Belt Co.
Clyde Iron Works Sales Co.
* Gifford-Wood Co.
* Jones, W. A. Fdry. & Mach. Co.
Lidgerwood Mfg. Co.
Link-Belt Co.

Hoists, Air
* Ingersoll-Rand Co.
* Nordberg Mfg. Co
Palmer-Bee Co.
* Whiting Corp'n

Hoists, Belt
Clyde Iron Works Sales Co.
Lidgerwood Mfg. Co.

Hoists, Chain
Palmer-Bee Co.
* Yale & Towne Mfg. Co.

Hoists, Electric
* Allis-Chalmers Mfg. Co.
* American Engineering Co.
* Brown Hoisting Machinery Co.
Clyde Iron Works Sales Co.
* General Electric Co.
Lidgerwood Mfg. Co.
Link-Belt Co.
* Nordberg Mfg. Co.
* Yale & Towne Mfg. Co.

Hoists, Gas and Gasoline
Lidgerwood Mfg. Co.

Hoists, Head Gate
Smith, S. Morgan Co.

Hoists, Locomotive & Coach
* Whiting Corp'n

Hoists, Mine
Lidgerwood Mfg. Co.
* Nordberg Mfg. Co.

Hoists, Skip
* Brown Hoisting Machinery Co.
Lidgerwood Mfg. Co.
Link-Belt Co.
Palmer-Bee Co.

Hoists, Steam
(See Engines, Hoisting)

Hose, Acid
* United States Rubber Co.

Hose, Air and Gas
* Goodrich, B. F. Rubber Co.
* United States Rubber Co.

Hose, Fire
* United States Rubber Co.

Hose, Gas
* United States Rubber Co.

Hose, Gasoline
* Goodrich, B. F. Rubber Co.
* United States Rubber Co.

Hose, Metal, Flexible
Johns-Manville (Inc.)

Hose, Oil
* United States Rubber Co.

Hose, Rubber
* Goodrich, B. F. Rubber Co.
* United States Rubber Co.

Hose, Steam
* United States Rubber Co.

Hose, Suction
* United States Rubber Co.

Humidifiers
* American Blower Co.
* Carrier Engineering Corp'n
* Sturtevant, B. F. Co.

Humidity Control
* American Blower Co.
* Carrier Engineering Corp'n
* Sturtevant, B. F. Co.
* Tagliabue, C. J. Mfg. Co.

Hydrants, Fire
Kennedy Valve Mfg. Co.
Murdock Mfg. & Supply Co.
* Reading Steel Casting Co. (Inc.) (Pratt & Cady Division)
* Worthington Pump & Machinery Corp'n

Hydrants, Yard
Murdock Mfg. & Supply Co.

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* Allis-Chalmers Mfg. Co.
* Ingersoll-Rand Co.
Mackintosh-Hemphill Co.
* Worthington Pump & Machinery Corp'n

Hydraulic Press Control Systems (Oil Pressure)
* American Fluid Motors Co.

Hydrokineters
Bethlehem Shipbldg.Corp'n(Ltd.)
* Schutte & Koerting Co.

Hydrometers
* Tagliabue, C. J. Mfg. Co.
* Taylor Instrument Cos.

Hygrometers
* Tagliabue, C. J. Mfg. Co.
* Taylor Instrument Cos.
Weber, F. Co. (Inc.)

Ice Handling Machinery
Palmer-Bee Co.

Ice Making Machinery
* De La Vergne Machine Co.
* Frick Co. (Inc.)
* Ingersoll-Rand Co.
Johns-Manville (Inc.)
* Nordberg Mfg. Co.
* Vilter Mfg. Co.
* Vogt, Henry Machine Co.

Ice Tools
* Gifford-Wood Co.

Idlers, Belt
Hill Clutch Machine & Fdry. Co.
* Smidth, F. L. & Co.

Indicator Posts
* Crane Co.
Kennedy Valve Mfg. Co.
* Reading Steel Casting Co. (Inc.) (Pratt & Cady Division)

Indicators, CO
* Uehling Instrument Co.

Indicators, CO_2
Bacharach Industrial Instrument Co.
* Uehling Instrument Co.

Indicators, Engine
* American Schaeffer & Budenberg Corp'n
Bacharach Industrial Instrument Co.
* Crosby Steam Gage & Valve Co.

Indicators, Sight Flow
* Bowser, S. F. & Co. (Inc.)

Indicators, SO_2
* Uehling Instrument Co.

*Catalogue data of firms marked * appear in the A.S.M.E. Condensed Catalogues of Mechanical Equipment, 1923-24 Volume*

Steels for. Research Reveals Properties of Steels Used for Gages. Automotive Industries, vol. 50, no. 14, Apr. 3, 1924, pp. 759–760. Investigations carried on at Bur. of Standards throw light on wear characteristics of different steels, hardened and unhardened; relative changes in size on hardening in oil and water; factors which affect time changes in gages.

GALVANIZING

Process. Galvanizing Process (Das "Neuverzinken"), H. Bablik. Stahl u. Eisen, vol. 44, no. 9, Feb. 28, 1924, pp. 223–225, 1 fig. Describes process which originated in Czechoslovakia and is now extensively employed in Austria; iron is dipped in liquid zinc, and resulting coatings consist of several layers of zinc of different composition; advantages of process; cost figures.

GAS ENGINES

Performance. Gas-engine Performance, F. Johnstone-Taylor. Mech. Wld., vol. 75, no. 1941, Mar. 14, 1924, pp. 161–162, 1 fig. Importance of mixture strength, and method of estimation.

GAS PRODUCERS

Practice. Gas Producer Practice, W. Dyrssen. Blast Furnace & Steel Plant, vol. 12, no. 3, Mar. 1924, pp. 161–165. Temperature of gas; blast temperature and steam consumption; use of oxygen in gas producers; influence of rate of gasification; instruments required for controlling and supervising operation of producers; preheating of blast; other cooling mediums than steam in producers.

GASES

Explosive Gas-Air Mixtures. Investigations of Combustible Gas- and Steam-Air Mixtures (Untersuchungen an expolsiblen Gas- und Dampf-Luft-Gemischen), E. Berl and H. Fischer. Zeit. für Elektrochemie, vol. 30, no. 1, Jan. 1924, pp. 29–36, 3 figs. Determination according to new method of explosion limits of mixtures of air with carbon monoxide, hydrogen, methane, acetylene, ethylene, alcohol, acetone, ether, benzol and gasoline at atmospheric pressure and room temperature; influence of temperature on explosive range at 100, 200 and 300 deg. cent.; influence of subpressure on system carbon monoxide-air. Bibliography.

GEAR CUTTING

Hobbing Machines. A New Gear Hobbing Machine. Automobile Engr., vol. 14, no. 187, Mar. 1924, p. 75, 1 fig. Describes new Brown & Sharpe spur-gear hobber.

Quality Testing. Quality Testing in the Manufacture of Gears (Güteprüfung bei der Zahnradherstellung), Frommer. Werkstattstechnik, vol. 18, no. 6, Mar. 15, 1924, pp. 176–178, 6 figs. Arrangements for investigation of helicoidal cutter of cutting machine and finished wheel; profile-testing machines; testing of pitch and trueness; investigation of condition of cutting machine.

GEARS

Calculation. The Calculation of Gears for Machine-Tool Construction (Zahnradberechnung für den Werkzeugmaschinenbau), A. Eberwein. Maschinenbau, vol. 3, no. 11, Mar. 13, 1924, pp. 359–361, 4 figs. Formulas are derived for calculation of machine-tool gears, making use of modulus method.

Involute. Degree of Irregularity of Involute Spur Gears (Ungleichförmigkeitsgrad von Evolventenstirnrädern), C. Miklósy. Werkstattstechnik, vol. 18, no. 6, Mar. 15, 1924, pp. 173–175, 3 figs. Author traces by calculation the irregular course of involute gears and describes method of determining series of cutters for a given degree of irregularity.

Non-Metallic. Laboratory Tests of Non-Metallic Gears, H. R. Moyer. Am. Mach., vol. 60, no. 14, Apr. 3, 1924, pp. 505–507, 4 figs. Work done to determine strength and endurance; evolution of testing equipment; tests for vibration and effect of oil; reproducing service conditions.

Spur. Standardized Roller for Checking Spur Gears, W. H. Folds. Machy. (Lond.), vol. 23, no. 598, Mar. 13, 1924, pp. 765–767, 3 figs. Writer proposed to standardize, to some extent, roller-check method by use of tables of factors, which makes it possible to use any size roller that will form contact on tooth faces or flanks, and from given diameter of roller, overall measurement over roller as it is located in teeth of gear can be calculated.

Testing. Gear Testing and Special Production (Zahnräderprüfung und Sonderherstellung), A. Steinle. Werkstattstechnik, vol. 18, no. 6, Mar. 15, 1924, pp. 169–173, 22 figs. Optical testing methods and instruments.

Tooth-Bearing Control. Tooth Bearing Control for Spiral Bevel Gears, Chas. H. Logue. Am. Mach., vol. 60, no. 15, Apr. 10, 1924, pp. 549–553, 9 figs. Importance of position of bearing along teeth; measurement of backlash by "pinion inclination;" "pinion intersection;" design and operation of suitable testing machine.

Worm. A New Enveloping Worm Gear. Machy. (Lond.), vol. 23, no. 599, Mar. 20, 1924, pp. 819–820, 4 figs. Describes form of worm gear with very high load-carrying capacity, which is extension of principle of straight-line generation to include its application to production of Hindley-type worm to which term "enveloping" gear has been applied.

Worm Gears and Windlasses, H. S. Howard. Am. Soc. Nav. Engrs.—Jl., vol. 36, no. 1, Feb. 1924, pp. 18–29. Conclusions and decisions as to future heavy-duty worm gears which may be built; worm gear which was investigated was in windlass of battleship Tennessee.

GRINDING

Automobile Parts. How Nash Motor Parts Are Ground, E. C. Boehringer. Abrasive Industry, vol. 5, no. 4, Apr. 1924, pp. 90–92 and 97, 7 figs. Grinding operations and equipment used at plants of Nash Motors Co., Milwaukee and Kenosha, Wis.

GRINDING

Motor-Truck Parts. Precision Grinding Operations Finish White Motor Trucks, F. B. Jacobs. Abrasive Industry, vol. 5, nos. 2, 3 and 4, Feb., Mar. and Apr. 1924, pp. 29–33, 60–64 and 98–101, 29 figs. Description of grinding methods followed at plant of White Motor Co., Cleveland, Ohio.

H

HARDNESS

Testing Machines. Hardness Testing, with Special Regard to Dynamic Hardness Testing Machines (Ueber Härteprüfung, mit besonderer Berücksichtigung des Fallhärteprüfers), M. v. Schwarz. Maschinenbau, vol. 3, no. 10, Feb. 28, 1924, pp. 316–319, 5 figs. Describes new type of hardness testing machine developed by author; results of tests showing its useful applications.

Work-Hardening of Metals and the Herbert Tester. Engineer, vol. 137, no. 3558, Mar. 7, 1924, pp. 248–251, 5 figs. Discusses use of pendulum tester (described in Apr. 13, 1923, issue of same journal) for investigation of scale hardness figures; gives list of work-hardening figures of various materials, as determined by E. G. Herbert, inventor of instrument. See also editorial on pp. 257–258.

HEAT PUMPS

Applications. Utilization of the Heat of Low Temperature (Ueber die Nutzbarmachung von Wärme niedriger Temperatur), Ferdinand. Gesundheits-Ingenieur, vol. 47, no. 11, Mar. 15, 1924, pp. 81–82, 9 figs. Describes applications of heat pumps which work on principle of refrigerating machines.

HEAT TRANSMISSION

Water Flowing Inside Pipes. Heat Transfer for Water Flowing Inside Pipes, W. H. McAdams and T. H. Frost. Refrig. Eng., vol. 10, no. 9, Mar. 1924, pp. 323–332 and (discussion) 332–334, 15 figs. Progress recently made in developing an equation which may be used by designer to predict numerical value of film coefficient of heat transfer between a clean pipe and water which is flowing through it in turbulent motion.

HEATING AND VENTILATING

School Buildings. Heating and Ventilating an Up-to-date School Building, T. E. Mason. Plumbers' Trade Jl., vol. 76, no. 6, Mar. 15, 1924, pp. 499, 502 and 504, 2 figs. Describes heating and ventilating system of high-school building now being erected in Saranac Lake, N. Y.; ventilating is of central fan system; vapor heating.

HEATING, ELECTRIC

Combination Cooking and Heating Oven. Recommendation for Utilization of Electric Energy for Cooking and Heating Purposes (Vorschlag zur Verwertung elektrischer Energie für Koch- und Heizgwecke), E. Boder. Schweiz. Elektrotechnischer Verein—Bul., vol. 15, no. 2, Feb. 1924, pp. 67–70, 4 figs. Investigates possibility of utilizing electric energy for calorific purposes in households and suggests scheme for simultaneous heating of kitchen and adjoining room, by means of electric cooking and heat-storage oven.

HEATING, HOUSE

Economic Installations. The Economic Design of House-Heating Installations (Die wirtschaftliche Gestaltung der Raumheizanlagen), P. Beck. Archiv für Wärmewirtschaft, vol. 5, no. 3, Mar. 1924, pp. 41–45. Comparison of stove and central heating; possibilities for improvement of central heating plants; making use of radiation and pipe losses; reduction of chimney losses; use of low-grade fuel.

HEATING, STEAM

Central-Station. Central Station Heating Proves Successful, H. A. Woodworth. Power Plant Eng., vol. 28, no. 7, Apr. 1, 1924, pp. 377–380, 3 figs. Discusses factors contributing to successful systems of central-station heating.

Unit Heaters. The Trend in the Unit Heater Field, A. H. Greene. Heat. & Vent. Mag., vol. 21, no. 3, Mar. 1924, pp. 55–57, 4 figs. Special reference to use of copper and brass radiators as a means of reducing size and weight and increasing efficiency.

HYDRAULIC ACCUMULATORS

Switzerland. Examples of Hydraulic Accumulators and Pumps in Switzerland, Italy and France (Exemples d'installations hydrauliques d'accumulation et de pompage, en Suisse, en Italie et en France). Génie Civil, vol. 84, no. 9, Mar. 1, 1924, pp. 208–210, 5 figs. Describes accumulator plants working principally with Sulzer centrifugal pumps, placed in operation during past few years.

HYDRAULIC DRIVE

Schneider. The Schneider Gear for the Drive of Machine Tools and Hoists (Das Schneider-Kapselgetriebe für den Antrieb von Werkzeugmaschinen und Hebezeugen), O. Keller. Schweizerische Bauzeitung, vol. 83, no. 9, Mar. 1, 1924, pp. 100–101, 8 figs. Describes new hydraulic drive patented by H. Schneider, with which any fine adjustment of speed according to material and feed can be made without interfering with operation; advantages of gear, which is a hydraulic change and reversing gear, consisting of two valveless pumps.

HYDROELECTRIC DEVELOPMENTS

Australia. Hume Reservoir for Hydro-Electric Development. Indus. Australian & Min. Standard, vol. 71, no. 1836, Feb. 14, 1924, pp. 242–244. Reports of investigations of possibility of utilizing Hume Reservoir (Australia) for hydroelectric development. Conclusion reached was that Hume Reservoir, with capacity as at present proposed, viz., 1,100,000 acre-ft. would have a potential value for development of hydroelectric power and that increasing of capacity of reservoir would add to that potential value.

Austria. Statistical, Economic and Legislative Data on Hydroelectric Development in Austria (Statistisches, Wirtschaftliches und Gesetzliches über den Ausbau der österreichischen Wasserkräfte), K. Naehr. Zeit. des Vereines deutscher Ingenieure, vol. 68, no. 10, Mar. 8, 1924, pp. 240–242. Fuel and energy consumption in Austria; water power as substitute; developments in recent years; most important enterprises; competition of steam power plants; legislative support for obtaining necessary investment capital.

Canada. Musquash Hydro-Electric Development, F. B. Casey. Can. Engr., vol. 46, no. 15, Apr. 8, 1924, pp. 405–409, 7 figs. Development in New Brunswick on Musquash River; three Morgan Smith turbines and C. G. E. generators develop 11,000 hp. for transmission to St. John and surrounding district and Moncton.

Economics of. The Economics of Hydro-Electric Development, D. W. Mead. Am. Soc. Civ. Engrs.—Proc., vol. 50, no. 4, Apr. 1924, pp. 417–452, 9 figs. Discusses following factors: Acquisition of suitable legal rights; command of satisfactory power market; suitable physical and hydrological conditions; proper design of works involved; economical construction and financing; rapid and economical development of business; management, operation and maintenance; accurate estimates; factors of economic expediency in consideration of proposed hydroelectric developments; capital costs; annual expenses; calculation of net revenue.

Western United States. Survey Shows 1924 Will Be Record Year for Hydro-electric Development. Jl. Electricity, vol. 52, no. 3, Feb. 1, 1924, pp. 96–99, 5 figs., 1 map. Survey of hydroelectric projects under way during 1923 or definitely scheduled for 1924.

HYDROELECTRIC PLANTS

Standard Tests for. Standard Tests for Hydraulic Power Plants. Engineer, vol. 137, no. 3562, Apr. 4, 1924, pp. 354–356, 3 figs. Discussion of report of Joint Committee appointed by Instns. of Mech. and Civ. Engrs. to draw up set of recommended rules for testing of hydraulic power plants.

I

ICE PLANTS

Design. The Essentials of the Modern Ice Plant, C. T. Baker. Ice & Refrigeration, vol. 66, no. 3, Mar. 1924, pp. 243–245. Type of plant, prime mover, compressors, freezing tank, air agitation system, condensers and piping. Paper read before North Carolina Ice Exchange.

Raw-Water. Raw Water Ice Plant of Miller Ice Co., Chicago Heights, Ill., V. P. Miller. Ice & Refrigeration, vol. 66, no. 3, Mar. 1924, pp. 239–241, 4 figs. Oil-engine-driven 50-ton ice-making-plant which has been remodeled and improved several times; description of mechanical equipment; vertical compressors belted to oil engines.

INDICATORS

Manograph, for High-Speed Engines. Indicator-Manograph (Indikator-Manograph Otto Schulze). Motor u. Auto, vol. 21, no. 1, Jan. 10, 1924, pp. 5–7, 8 figs. Describes optical indicator manufactured by Osa Apparate Gesellschaft, Frankfort, Germany, which can be used for speeds up to 8000 r.p.m.; diagrams are stated to be not only qualitatively but quantitatively correct, so that actual pressure conditions in cylinder can be determined.

INDUSTRIAL MANAGEMENT

Engineering and Operating Departments, Relation of. The Relation of the Engineering Department to the Operating Department, F. J. Crolius. Engrs.' Soc. West. Pa.—Proc., vol. 40, no. 2, Mar. 1924, pp. 45–52 and (discussion) 53–55. Relates incidents and results accomplished through coördinated engineering investigation; discusses combustion, centrifugal force; etc.

Estimating. Estimating. Engineer, vol. 137, no. 3558, Mar. 7, 1924, pp. 244–246, 5 figs. Deals with requirements of factory employing about 5000 hands, and manufacturing more than one type of product; personnel of department; preparation of estimate; coördination of effort.

Material Purchasing and Control. One Master Form Basis of Material Buying and Control System, W. L. Carver. Automotive Industries, vol. 50, no. 15, Apr. 10, 1924, pp. 806–811, 6 figs. Scheme of material purchasing and control at plant of Chandler Motor Car Co. eliminates bookkeeping from purchasing, stock and production departments.

Pricing Policy. Pricing Policy in Relation to Financial Control, Donaldson Brown. Mgt. & Administration, vol. 7, nos. 2, 3 and 4, Feb., Mar. and Apr., 1924, pp. 195–198, 283–286 and 417–422. Outlines method of price analysis which, though resting upon theoretical basis, is wholly practical; theory of pricing of Gen. Motors Corp.

Production Control. Maintaining a Profit with Reduced Prices, E. A. Munschaure. Mgt. & Ad-

Manufactured by Advertisers

CLASSIFIED LIST OF MECHANICAL EQUIPMENT

Alphabetical List on page 156

Indicators, Speed
* American Schaeffer & Budenberg Corp'n
Veeder Mfg. Co.

Injectors
* Schutte & Koerting Co.

Injectors, Air
* Croll-Reynolds Engrg. Co.

Instruments, Electrical Measuring
* General Electric Co.
* Taylor Instrument Cos.
* Westinghouse Electric & Mfg. Co.

Instruments, Oil Testing
* Tagliabue, C. J. Mfg. Co.

Instrument, Recording
* American Schaeffer & Budenberg Corp'n
* Ashton Valve Co.
Bacharach Industrial Instrument Co.
* Baily Meter Co.
* Bristol Co.
* Builders Iron Foundry
* Crosby Steam Gage & Valve Co.
* General Electric Co.
* Tagliabue, C. J. Mfg. Co.
* Taylor Instrument Cos.
* Uehling Instrument Co.
* Westinghouse Electric & Mfg. Co.

Instruments, Scientific
* Taylor Instrument Cos.
Weber, F. Co. (Inc.)

Instruments, Surveying
Dietzgen, Eugene Co.
Keuffel & Esser Co.
New York Blue Print Paper Co.
ParVell Laboratories
U. S. Blue Co.
Weber, F. Co. (Inc.)

Insulating Materials (Electrical)
* General Electric Co.
Johns-Manville (Inc.)

Insulating Materials (Heat and Cold)
* Celite Products Co.
Johns-Manville (Inc.)
* King Refractories Co. (Inc.)
* Quigley Furnace Specialties Co.

Insulation, Boiler
Carey, Philip Co.
* Celite Products Co.

Insulation, Heat
Carey, Philip Co.

Irrigation Systems
* Spray Engineering Co.

Joints, Expansion
* Crane Co.
* Croll-Reynolds Engineering Co.
Hamilton Copper & Brass Works
Lunkenheimer Co.
* Pittsburgh Valve, Fdry. & Const. Co.
* United States Rubber Co.
* Wheeler, C. H. Mfg. Co.

Joints, Flanged Pipe
* Crane Co.
* Pittsburgh Valve, Fdry. & Const. Co.

Joints, Flexible
* Barco Mfg. Co.

Joints, Swing and Swivel
* Barco Mfg. Co.
Lunkenheimer Co.

Kettles, Steam Jacketed
* Cole, R. D. Mfg. Co.
* Nordberg Mfg. Co.
* Titusville Iron Works Co.

Keys, Machine
* Smith & Serrell
* Whitney Mfg. Co.

Keyseating Machines
* Whitney Mfg. Co.

Kilns, Dry (Brick, Lumber, Stone, etc.)
* American Blower Co.
* Sturtevant, B. F. Co.

Ladles
* Whiting Corp'n

Lamps, Incandescent
* General Electric Co.
Johns-Manville (Inc.)
* Westinghouse Electric & Mfg. Co.

Land-Clearing Machinery
Clyde Iron Works Sales Co.

Lathes, Automatic
* Jones & Lamson Machine Co.

Lathes, Brass
* Warner & Swasey Co.

Lathes, Chucking
* Jones & Lamson Machine Co.

Lathes, Engine
* Builders Iron Foundry

Lathes, Turret
* Jones & Lamson Machine Co.
* Warner & Swasey Co.

Levers, Flexible (Wire)
* Gwilliam Co.

Lifts, Lumber
Leitelt Iron Works

Lighting Equipment
* Westinghouse Elect. & Mfg. Co

Linings, Brake
Johns-Manville (Inc.)

Linings, Furnace
* Celite Products Co.
Johns-Manville (Inc.)
* King Refractories Co. (Inc.)
* McLeod & Henry Co.
* Quigley Furnace Specialties Co.

Linings, Stack
Johns-Manville (Inc.)

Loaders, Portable
* Gifford-Wood Co.
Link-Belt Co.

Locomotives, Electric
* General Electric Co.
* Westinghouse Electric & Mfg. Co.

Locomotives, Storage Battery
* General Electric Co.
* Westinghouse Electric & Mfg. Co.

Logging Machinery
Clyde Iron Works Sales Co.
Lidgerwood Mfg. Co.

Looms
Fletcher Works

Lubricants
* Dixon, Joseph Crucible Co.
* Royersford Fdry. & Mach. Co.
Vacuum Oil Co.

Lubricating Systems
* Bowser, S. F. & Co. (Inc.)
Lunkenheimer Co.

Lubricators, Cylinder
* Bowser, S. F. & Co. (Inc.)
Lunkenheimer Co

Lubricators, Force-Feed
* Bowser, S. F. & Co. (Inc.)
Lunkenheimer Co.

Lubricators, Hydrostatic
* Crosby Steam Gage & Valve Co.
Lunkenheimer Co.

Lubricators (Sight Feed)
* Crosby Steam Gage & Valve Co.
Lunkenheimer Co.

Machine Tool Feed Control Systems (Oil Pressure)
* American Fluid Motors Co.

Machine Work
* American Machine & Foundry Co.
* Brown, A. & F. Co.
* Builders Iron Foundry
DuPont Engineering Co.
Farrel Foundry & Machine Co.
* Franklin Machine Co.
Hill Clutch Machine & Fdry. Co.
Johnson, Carlyle Machine Co.
* Jones, W. A. Fdry. & Mach. Co.
Lammert & Mann Co.
Link-Belt Co.
* Nordberg Mfg. Co.

Machinery
(Is classified under the headings descriptive of character thereof)

Manometers
* American Blower Co.
Bacharach Industrial Instrument Co.
* Simplex Valve & Meter Co.

Mechanical Draft Apparatus
* American Blower Co.
* Clarage Fan Co.
* Coppus Engineering Corp'n
* Green Fuel Economizer Co.
* Sturtevant, B. F. Co.

Mechanical Stokers
(See Stokers)

Metal Treating
* American Metal Treatment Co.

Metals, Perforated
* Hendrick Mfg. Co.

Meters, Air and Gas
Bacharach Industrial Instrument Co.
* Bailey Meter Co.
* Builders Iron Foundry
* General Electric Co.

Meters, Boiler Performance
* Bailey Meter Co.

Meters, Condensation
* Simplex Valve & Meter Co.

Meters, Electric
* General Electric Co.
* Westinghouse Electric & Mfg. Co.

Meters, Feed Water
* Bailey Meter Co.
* Builders Iron Foundry
* Cochrane Corp'n
* General Electric Co.
Hoppes Mfg. Co.
* Simplex Valve & Meter Co.
* Worthington Pump & Machinery Corp'n

Meters, Flow
Bacharach Industrial Instrument Co.
* Bailey Meter Co.
* Cochrane Corp'n
* General Electric Co.
* Simplex Valve & Meter Co.
* Spray Engineering Co.

Meters, Oil
* Bowser, S. F. & Co. (Inc.)
* Cochrane Corp'n
* General Electric Co.
* Simplex Valve & Meter Co.
* Worthington Pump & Machinery Corp'n

Meters, Pitot Tube
* American Blower Co.
* Simplex Valve & Meter Co.

Meters, Steam
* Bailey Meter Co.
* Builders Iron Foundry
* Cochrane Corp'n
* General Electric Co.

Meters, V-Notch
* Bailey Meter Co.
* Cochrane Corp'n
* General Electric Co.

Meters, Venturi
* Builders Iron Foundry
* National Meter Co.
* Simplex Valve & Meter Co.

Meters, Water
* Cochrane Corp'n
* General Electric Co.
Hoppes Mfg. Co.
* National Meter Co.
* Simplex Valve & Meter Co.
* Worthington Pump & Machinery Corp'n

Milling and Drilling Machines (Combined)
Universal Boring Machine Co.

Milling Machines, Hand
* Whitney Mfg. Co.

Milling Machines, Keyseat
* Whitney Mfg. Co.

Milling Machines, Plain
* Warner & Swasey Co.

Mills, Ball
* Allis-Chalmers Mfg. Co.
* Smidth, F. L. & Co.
* Worthington Pump & Machinery Corp'n

Mills, Blooming and Slabbing
Mackintosh-Hemphill Co.

Mills, Grinding
Farrel Foundry & Machine Co.
* Smidth, F. L. & Co.

Mills, Sheet and Plate
Mackintosh-Hemphill Co

Mills, Structural, Rail and Bar
Mackintosh-Hemphill Co.

Mills, Tube
* Allis-Chalmers Mfg. Co.
* Smidth, F. L. & Co.
* Worthington Pump & Machinery Corp'n

Mining Machinery
* Allis-Chalmers Mfg. Co.
* General Electric Co.
* Ingersoll-Rand Co.
* Worthington Pump & Machinery Corp'n

Monel Metal
Driver-Harris Co.

Monorail Systems
(See Tramrail Systems, Overhead)

Motor-Generators
* Allis-Chalmers Mfg. Co.
* General Electric Co.
Ridgway Dynamo & Engine Co.
* Westinghouse Electric & Mfg. Co.

Motors, Electric
* Engberg's Electric & Mech. Wks.
* General Electric Co.
Master Electric Co.
Ridgway Dynamo & Engine Co.
* Sturtevant, B. F. Co.
* Westinghouse Electric & Mfg. Co.

Motors, Synchronous
Ridgway Dynamo & Engine Co.

Nickel, Sheet
Driver-Harris Co.

Nipple Threading Machines
* Landis Machine Co. (Inc.)

Nitrogen Gas
* Linde Air Products Co.

Nozzles, Aerating
* Spray Engineering Co.

Nozzles, Blast
* Schutte & Koerting Co.

Nozzles, Sand and Air
Lunkenheimer Co.

Nozzles, Spray
* Cooling Tower Co. (Inc.)
* Schutte & Koerting Co.
* Spray Engineering Co.

Odometers
Veeder Mfg. Co.

Ohmeters
* General Electric Co.

Oil and Grease Cups
* Bowser, S. F. & Co. (Inc.)
* Crane Co.
Lunkenheimer Co.

Oil and Grease Guns
* Royersford Fdry. & Mach. Co

Oil Burning Equipment
Bethlehem Shipbldg.Corp'n(Ltd.)
* Combustion Engineering Corp'n
* Schutte & Koerting Co.

Oil Filtering and Circulating Systems
* Bowser, S. F. & Co. (Inc.)
Nugent, Wm. W. & Co. (Inc.)

Oil Mill Machinery
* Worthington Pump & Machinery Corp'n

Oil Refinery Equipment
Bethlehem Shipbldg.Corp'n(Ltd.)
* Vogt, Henry Machine Co.

Oil Storage and Distributing Systems
* Bowser, S. F. & Co. (Inc.)

Oil Well Machinery
* Ingersoll-Rand Co.
* Titusville Iron Works Co.
* Worthington Pump & Machinery Corp'n

Oiling Devices
* Bowser, S. F. & Co. (Inc.)
Lunkenheimer Co.
Nugent, Wm. W. & Co. (Inc.)

Oiling Systems
* Bowser, S. F. & Co. (Inc.)
Lunkenheimer Co.
Nugent, Wm. W. & Co. (Inc.)

Oils, Lubricating
Vacuum Oil Co.

Ore Handling Machinery
* Brown Hoisting Machinery Co
Chain Belt Co.
Link-Belt Co.

Ovens, Core
* Whiting Corporation

Oxy-Acetylene Supplies
* Linde Air Products Co.

Oxygen Gas
* Linde Air Products Co.

Packing, Ammonia
Garlock Packing Co.
* Goodrich, B. F. Rubber Co.
* United States Rubber Co.

Packing, Asbestos
Garlock Packing Co.
* Goodrica, B. F. Rubber Co.
Johns-Manville (Inc.)
Steel Mill Packing Co.

Packing, Centrifugal Pump
Garlock Packing Co.

Packing, Hydraulic
Garlock Packing Co.
* Goodrich, B. F. Rubber Co.
Johns-Manville (Inc.)
Steel Mill Packing Co.

Packing, Metallic
Garlock Packing Co.
Johns-Manville (Inc.)
Steel Mill Packing Co.

Packing, Rod (Piston and Valve)
Garlock Packing Co.
* Goodrich, B. F. Rubber Co.
* Jenkins Bros.
Johns-Manville (Inc.)
Steel Mill Packing Co.
* United States Rubber Co.

Packing, Rubber
Garlock Packing Co.
* Goodrich, B. F. Rubber Co.
* Jenkins Bros.
Johns-Manville (Inc.)
* United States Rubber Co.

*Catalogue data of firms marked * appear in the A.S.M.E. Condensed Catalogues of Mechanical Equipment, 1923-24 Volume*

ministration, vol. 7, no. 4, Apr. 1924, pp. 401–404, 4 figs. How capacity of plant for manufacturing refrigerators was increased 50 per cent and unit costs lowered.

Production Planning. New Methods of Production Planning That Make Heavy Stocks Unnecessary. Factory, vol. 32, no. 4, Apr. 1924, pp. 480–482 and 528, 1 fig. Methods employed in large machine-tool manufacturing plant, in which standardization is stressed; how production budget aids planning.

Purchasing and Inventories. The Relationship of Purchasing to Inventories, H. N. Stronck. Factory, vol. 32, no. 4, 1924, pp. 501–503, 606 and 608–609. Notes based upon observations made during examination of manufacturing enterprises of large variety of industries, and in all parts of country.

Stores Control. Step by Step Details for Obtaining Equipment and Supplies for Maintenance, J. E. Housley. Indus. Engr., vol. 82, no. 4, Apr. 1924, pp. 169–173, 6 figs. Routine followed in an industrial plant for procuring supplies, with methods of storing and accounting for material.

INDUSTRIAL RELATIONS

Lumber Industry. Industrial Relations in the West Coast Lumber Industry, C. R. Howd. U. S. Bur. Labor Statistics, no. 349, Dec. 1923, 120 pp., 2 charts. Examination of lumber industry, particularly financial conditions and kind of work men do; technology of industry and demands it makes on employees; hours, rates of wages, and working and living conditions; history of organized or articulate protests of employees and reactions of employers.

INSULATION, HEAT

Tests. Insulation, G. A. Young and E. F. Burton. Refrig. Eng., vol. 10, no. 9, Mar. 1924, pp. 345–348. Properties of low-temperature insulating materials; types of insulation; unit of heat flow; facilities for insulation tests at Purdue University; Master Car Bldrs.' Assn. model electric calorimeter; Bur. of Standards model electric calorimeter.

INSURANCE

Group. Group Life Insurance on Twenty-seven Railroads. Ry. Age, vol. 76, no. 18, Apr. 5, 1924, pp. 881–883. List of roads on which such insurance is in force; with notes on differences in details.

Workmen's Compensation and. Workmen's Compensation, Health and Accident Insurance in the German State Railway since the Year 1920 (Die Arbeiterpensionskassen, die Krankenkassen und die Unfallversicherung bei der Deutschen Reichsbahn seit dem Jahre 1920), O. Kuhatscheck. Archiv. für Eisenbahnwesen, no. 1, Jan.—Feb. 1924, pp. 44–63. Conditions and results of health, accident and invalidity insurance since 1920.

INTERNAL-COMBUSTION ENGINES

Factory Power Plants. The Control of Power Production, Chas. L. Hubbard. Factory, vol. 32, no. 4, Apr. 1924, pp. 482–486, 17 figs. Internal-combustion engines as source of factory power.

Mewes. The Mewes Engine, Old and New Types (Der Mewes-Motor in alter und neuer Bauart), R. Mewes. Zeit. für Sauerstoff- u. Stickstoff-Industrie, vol. 14, no. 12, Dec. 1922, pp. 141–144, and vol. 15, nos. 1, 2, 3, 5, 7, 8, 9, 10 and 11, Jan., Feb., Mar., May, July, Aug., Sept., Oct. and Nov. 1923, pp. 2–3, 10–11, 18–19, 33–37, 49–54, 61–64, 65–68 and 69–72, and vol. 16, no. 2, Feb. 1924, pp. 12–14, 8 figs. Construction, operation and efficiency of 1901 type, and new developments added; indicator diagrams; objections raised against Mewes engine; Mewes gas-air-pressure engine, using exhaust gases of explosion and internal-combustion engines mixed with compressed air; advantages of Mewes engine; theory.

Technical Aspects. Some Technical Aspects of the Internal-Combustion Turbine. Power Engr., vol. 19, no. 216, Mar. 1924, pp. 107–109, 1 fig. Survey of present knowledge and practice.

Theory of. Contribution to the Theory of Internal-Combustion Engines (Contribution à la théorie des moteurs à combustion interne), M. Brutzkus. Technique Moderne, vol. 16, no. 4, Feb. 15, 1924, pp. 105–112, 7 figs. Rudiments and formulas of theoretical chemistry; combustion in engines and variation of pressure; combustion and variation of temperature; combined action of these three factors; study of fuels employed.

[See also AIRPLANE ENGINES; AUTOMOBILE ENGINES; DIESEL ENGINES; GAS ENGINES; OIL ENGINES.]

INVENTION

Stimulation of Employees. How to Stimulate Invention by Employees, H. A. Toulmin, Jr. Factory, vol. 32, no. 4, Apr. 1924, pp. 490–492, 580 and 582, 6 figs. Nine methods from experience of five companies.

IRON AND STEEL

Chemical Specifications, Interpretation of. Interpretation of Chemical Specifications for Iron and Steel in Relation to Analytical Accuracy, C. H. Ridsdale. Iron & Coal Trades Rev., vol. 108, no. 2923, Mar. 7, 1924, pp. 382–383. Abstract of paper read at joint meeting of Cleveland Instn. Engrs., Newcastle Sec. Soc. Chem. Industry, and Inst. of Chemistry.

IRON CASTINGS

Permanent-Mold. Permanent Mold Casting Methods Cut Production Expense, D. H. Meloche. Automotive Industries, vol. 50, no. 13, Mar. 27, 1924, pp. 711–714, 11 figs. Chief problem in developing successful method was to regulate properly cooling rate; results achieved have resulted in better quality and less cost. (Abstract.) Paper read before Soc. Automotive Engrs.

Welding. The Influence of Mass Upon Methods of Preheating and Welding Large Iron Castings. Acetylene Jl., vol. 25, no. 9, Mar. 1924, pp. 441–443, 4 figs. Typical example of difficulties encountered in repairing massive castings, and correct method of carrying out repair. From Acetylene & Welding Jl., Lond.

J

JIGS

Bevel Gear-Testing. Double Helical Bevel Gear-Testing Jig. Machy. (Lond.), vol. 23, no. 596, Feb. 28, 1924, p. 711, 3 figs. Special jig for testing both accuracy and truth of apex in double helical bevel wheels, as used in automobile back-axle drives.

L

LATHES

Chucking Operations. The Machining of Small Components. Machy. (Lond.), vol. 23, no. 599, Mar. 20, 1924, pp. 793–803, 27 figs. Chucking operations on small automatic and capstan machines.

Gear-Box Design. Production Design of a Lathe Feed Gear-box, A. Clegg. Machy. (Lond.), vol. 23, no. 597, Mar. 6, 1924, pp. 735–737, 3 figs. Gives example of expensive design of 3-speed lathe feed-gear box and shows how this can be substituted by cheaper and better design of similar gear box.

LOCOMOTIVES

Boosters. The Locomotive Booster, M. H. Roberts. Ry. & Locomotive Eng., vol. 37, no. 4, Apr. 1924, pp. 111–115, 6 figs. Effect of locomotive booster on operation and its efficiency as engine.

China, Types Used in. Locomotive Practice on the Chinese Government Railways. Ry. Engr., vol. 45, no. 529, Feb. 1924, pp. 66–69, 9 figs. Data on locomotives used on the different railways; a multiplicity of types of international origin are in use, but efforts toward standardization are being pursued.

Compound. Compound Locomotives. Times Trade & Eng. Supp., vol. 14, no. 297, Mar. 15, 1924, p. 23. Discusses their reintroduction on British railways, giving data on different types.

Condensing. Paris-Orleans Condensing Locomotive, H. Leflot. Ry. Mech. Engr., vol. 98, no. 4, Apr. 1924, pp. 211–212, 3 figs. Means adopted on suburban tank locomotive for condensing exhaust steam while passing through long tunnel.

Connecting-Rod Failures. Locomotive Connecting Rod Failures. Ry. Engr., vol. 44, no. 527, Dec. 1923, pp. 457–460, 3 figs. Report to Ministry of Transport on accident at Betley Road, near Crewe, Lond. Midland & Scottish Ry.

Decapod, Russian. Russian "Decapod" Locomotives, A. Lipetz. Ry. Engr., vol. 45, no. 530, Mar. 1924, pp. 104–108, 12 figs. Describes frames and running gear, cab, running-board, jacket, draw-gear, brakes, tools, sandbox and sanders, radial buffer connection, tender, etc. (Continuation from Aug. 1923 issue, p. 313.)

Design and Construction. Modern Locomotive Engine Design and Construction. Ry. Engr., vol. 45, no. 529, Feb. 1924, pp. 50–53 and 65, 1 fig. Coned helical and volute springs; stresses in locomotive wheels; wheel-boss stresses; stresses in wheel tires.

Freight. 1 E Large Freight Locomotives of the Austrian Federal Railway (1 E-Grossgüterzuglokomotiven der österreichischen Bundesbahnen), J. Rihosek. Zeit. des Vereines deutscher Ingenieure, vol. 68, no. 10, Mar. 8, 1924, pp. 225–232, 26 figs. Results of preliminary tests of coal-saving equipment; new designs of 1 E locomotives, series 81; details of Dabeg spray preheater; exhaust-gas preheater; Davies and Metcalfe exhaust-steam injector; Lentz valve gear; etc.

Mallet. Simple Mallets for the Chesapeake & Ohio. Ry. Age, vol. 76, no. 19, Apr. 12, 1924, pp. 927–929, 4 figs. 2–8–8–2 type designed to meet restricted clearances; rated tractive force 103,500 lb. See also description in Ry. Rev., vol. 74, no. 14, Apr. 5, 1924, pp. 631–640, 13 figs.

Mikado. New Mikado Type Locomotives for the Wabash R. R. Ry. Rev., vol. 74, no. 13, Mar. 29, 1924, pp. 593–599, 6 figs. New 2–8–2–type freight engines somewhat larger than other locomotives of same type in use on this road.

0-6-0 Type. Shipping Complete Locomotives to India. Ry. Engr., vol. 45, no. 530, Mar. 1924, pp. 95–96 and 108, 6 figs. Principal data on 0–6–0 type British built locomotives delivered to East Indian Ry. at Calcutta.

Steam-Turbine. Developments of the Ljungström Locomotive. Ry. Age, vol. 76, no. 17, Mar. 29, 1924, pp. 849–850, 2 figs. Its performance and later developments in design.

Ljungström Steam Locomotive (Ljungströms Locomotiv), I. F. Johansen. Ingeniören, vol. 33, no. 6, Feb. 9, 1924, pp. 61–68, 16 figs. Description of Swedish locomotive; great economy obtained by this design shown by test data; fuel consumption reduced about 50 per cent as compared to locomotives of usual design.

Superheater. 1 E- (2–10–0) Two-Cylinder Superheated Goods Train Locomotive for the Polish State Railways. Eng. Progress, vol. 5, no. 2, Feb. 1924, pp. 29–34, 14 figs. Locomotives built partly by Berlin Machine Co. and partly by Belgian works; requirements and characteristics; results of trial trips. See also description in Ry. Gaz., vol. 40, no. 12, Mar. 21, 1924, pp. 416 and 422, 3 figs.

Three-Cylinder. L. V. Tests of Three-Cylinder Locomotive. Ry. Mech. Engr., vol. 98, no. 4, Apr. 1924, pp. 203–206, 9 figs. Fast movement of heavy trains produced with low fuel consumption and high boiler efficiency; results of tests run on Lehigh Valley mountain-type locomotive no. 5000, for freight service. See also Ry &. Locomotive Eng., vol. 37, no. 4, Apr. 1924, pp. 103–105, 13 figs.

Types. Modern Locomotive Types (Zusammenstellung neuerer Lokomotivbauarten), C. Müller. Praktischer Maschinen-Konstrukteur, vol. 57, no: 7, Feb. 25, 1924, pp. 69–76, 18 figs. Deals with adhesion, rack, and combined adhesion and rack locomotives; passenger and freight locomotives with and without tenders.

LUBRICANTS

Handling and Storage. Good Practice in Handling and Storing Lubricants. Lubrication, vol. 10, no. 1, Jan. 1924, pp. 1–12, 13 figs. Discusses factors involved in storage of lubricants, including construction of oil house or oil room, storage tanks and their accessory equipment for handling products and shipping containers, extent to which semi-solid lubricants are to be used, etc.,

LUBRICATING OILS

Automobile-Engine. Lubricating Oils for Automobile Engines (Die Schmieröle für Automobilmotoren), H. Franz. Motorwagen, vol. 27, no. 7, Mar. 10, 1924, pp. 105–108, 5 figs. Study of process of lubrication in automobile engines and properties of lubricating oils in connection therewith.

LUBRICATION

Bearings. Achieving Safety in Lubrication, R. W. A. Brewer. Iron Age, vol. 113, no. 12, Mar. 20, 1924, pp. 857–859, 6 figs. Fundamental principles which underlie art of correct lubrication; results of tests; fatty acids prevent seizure of heavily loaded bearings; normal working friction more important than abnormal conditions.

Journal Bearings. The Mechanism of Lubrication, D. P. Barnard, H. M. Myers and H. O. Forrest. Indus. & Eng. Chem., vol. 16, no. 4, Apr. 1924, pp. 347–350, 8 figs. Effect of oiliness on behavior of journal bearings.

Locomotive Flanges. A Pneumatic Flange Oiler. Ry. Age, vol. 76, no. 17, Mar. 29, 1924, pp. 841–842, 2 figs. Describes Hoofer flange oiler for lubricating locomotive and wheel flanges.

Multiple-Feed High-Pressure. Experiences with Multiple Feed, High Pressure Lubrication, L. R. Humpton. Iron & Steel Engr., vol. 1, no. 3, Mar. 1924, pp. 127–129, 3 figs. Describes installation of lubricators in steel works and successful results.

M

MACHINE DESIGN

Kinematic Study of Mechanisms. The Systematic Use of Bright Colors in the Study of Drives and Mechanisms (Die systematische Anwendung bunter Farben in der Getriebelehre), Hundhausen. Maschinenbau, vol. 3, no. 11, Mar. 13, 1924, pp. 355–356, 13 figs. on supp. plate. Discusses method employed successfully for many years by author, of using bright colors in order to distinguish different parts of a mechanism from one another or the separate groups from an assembled set; includes kinematic instrument sheet, showing use of colors.

MACHINE TOOLS

German. The Machine-Tool Exhibition of the Society of German Machine-Tool Builders at the Leipzig Technical Fair 1924 (Die Werkzeugmaschinenausstellung des Vereines Deutscher Werkzeugmaschinenfabriken auf der Leipziger Technischen Messe 1924), O. Rambuscheck. Maschinenbau, vol. 3, no. 10, Feb. 28, 1924, pp. 269–299, 116 figs. Describes tools and machine tools for metal and wood working. See also article by H. Pfennig, entitled New Machine Tools (Neue Werkzeugmaschinen), pp. 300–301, 4 figs., describing three new machines exhibited at show namely, a turret lathe, grinding machine and automatic milling machine.

Special. "Ten Cookie Cutters per Minute," K. H. Crumrine. Am. Mach., vol. 60, no. 15, Apr. 10, 1924, pp. 535–537, 5 figs. How obstacles in development of special machines for making cookie cutter were overcome; cutting irregular pieces from thin aluminum tubing; mechanism based on ordinary pipe-cutter finally successful.

MACHINING

Shouldered Work. Accuracy in Machining Shouldered Work, A. A. Dowd. Machy. (N. Y.), vol. 30, no. 8, Apr. 1924, pp. 590–591, 3 figs. Method of obtaining accurate shoulder distances with turret lathe. Accurate facing on a drill press.

MANGANESE STEEL

Casting. Casting Manganese Steel, H. E. Diller, Foundry, vol. 52, nos. 7 and 8, Apr. 1 and 15, 1924, pp. 245–249 and 298–302, 14 figs. Apr. 1: Describes open-hearth converter and electric-furnace processes; methods of adding manganese to steel; metal softened by heating in oven and quenching. Apr. 15: Heat treatment in electric furnaces; quality of metal determined by bending test piece; details of molding and handling track work.

MARINE BOILERS

Tests. Tests on a Cylindrical Marine Boiler with and without Preheated Air, W. H. Owen. Mar. Eng.,

Manufactured by Advertisers

CLASSIFIED LIST OF MECHANICAL EQUIPMENT

Alphabetical List on page 156

Packing, Sheet
Garlock Packing Co.
* Goodrich, B. F. Rubber Co.
* Jenkins Bros.
Johns-Manville (Inc.)
Steel Mill Packing Co.
* United States Rubber Co.

Paints, Concrete (For Industrial Purposes)
Smooth-On Mfg. Co.

Paint, Metal
* Dixon, Joseph Crucible Co.
* General Electric Co.
Johns-Manville (Inc.)

Panel Boards
* Westinghouse Elect. & Mfg. Co.

Paper, Drawing
Dietzgen, Eugene Co.
Keuffel & Esser Co.
New York Blue Print Paper Co.
ParVell Laboratories
U. S. Blue Co
Weber, F. Co. (Inc.)

Paper, Sensitized
Dietzgen, Eugene Co.
Keuffel & Esser Co.
New York Blue Print Paper Co.
ParVell Laboratories
U. S. Blue Co.
Weber, F. Co. (Inc.)

Paper Mill Machinery
Farrel Foundry & Machine Co.

Paraffine Wax Plant Equipment
Bethlehem Shipbldg.Corp'n(Ltd.)
* Vogt, Henry Machine Co.

Pasteurizers
* Vilter Mfg. Co.

Pattern Work
* American Machine & Foundry Co
DuPont Engineering Co.

Pencils, Drawing
American Lead Pencil Co.
Dietzgen, Eugene Co.
* Dixon, Joseph Crucible Co.
Keuffel & Esser Co.
New York Blue Print Co.
ParVell Laboratories
U. S. Blue Co.
Weber, F. Co. (Inc.)

Penstocks
Smith, S. Morgan Co

Pile Drivers
Clyde Iron Works Sales Co.
Lidgerwood Mfg. Co.

Pinions, Rolling Mill
Mackintosh-Hemphill Co.

Pinions, Steel
* General Electric Co.

Pipe, Brass and Copper
* Wheeler Condenser & Engrg. Co.

Pipe, Cast Iron
* Builders Iron Foundry
* Central Foundry Co.
* U. S. Cast Iron Pipe & Fdry. Co.

Pipe, Riveted
* American Spiral Pipe Wks.
* Springfield Boiler Co.
Steere Engineering Co.
* Titusville Iron Works Co.
* Walsh & Weidner Boiler Co.

Pipe, Soil
* Central Foundry Co.

Pipe, Steel
* Crane Co.
Steere Engineering Co.

Pipe, Welded
* American Spiral Pipe Wks.
* Crane Co.
* Pittsburgh Valve, Fdry. & Const. Co.
Steere Engineering Co.

Pipe, Wrought Iron
Byers, A. M. Company
* Crane Co.

Pipe Coils, Covering, Fittings, etc.
(See Coils, Covering, Fittings, etc., Pipe)

Pipe Cutting and Threading Machines
* Crane Co.
* Landis Machine Co. (Inc.)

Pipe Threading Machines
Treadwell Engineering Co.

Piping, Ammonia
* Frick Co. (Inc.)

Piping, Power
* Crane Co.
* Pittsburgh Valve, Fdry. & Const. Co.
Steere Engineering Co.
* Vogt, Henry Machine Co.

Pitot Tubes
(See Tubes, Pitot)

Planimeters
* American Schaeffer & Budenberg Corp'n
* Bristol Co.
* Crosby Steam Gage & Valve Co.
Dietzgen, Eugene Co.
Keuffel & Esser Co.
New York Blue Print Co.
ParVell Laboratories
U. S. Blue Co.
Weber, F. Co. (Inc.)

Plate Metal Work
(See Steel Plate Construction)

Pointers, Bolt
* Landis Machine Co. (Inc.)

Polishing Machinery
* Builders Iron Foundry
* Royersford Fdry. & Mach. Co.

Powdered Fuel Equipment (for Boiler and Metallurgical Furnaces)
* Allis-Chalmers Mfg. Co.
* Combustion Engineering Corp'n
Grindle Fuel Equipment Co.
* Quigley Furnace Specialties Co.
* Smidth, F. L. & Co.
* Worthington Pump & Machinery Corp'n

Power Transmission Machinery
* Allis-Chalmers Mfg. Co.
* Brown, A. & F. Co.
Chain Belt Co.
* Diamond Chain & Mfg. Co.
* Falls Clutch & Machinery Co.
Farrel Foundry & Machine Co.
* Franklin Machine Co.
* General Electric Co.
Hill Clutch Machine & Fdry. Co.
* Hyatt Roller Bearing Co.
* Jones, W. A. Fdry. & Mach. Co.
Link-Belt Co.
* Medart Co.
* Morse Chain Co.
Palmer-Bee Co.
* Royersford Fdry. & Mach. Co.
* Smidth, F. L. & Co.
Smith, S. Morgan Co.
* Woods, T. B. Sons Co.

Preheaters, Air
* Combustion Engineering Corp'n
Prat-Daniel Corporation

Presses, Baling
* Franklin Machine Co.

Presses, Draw
* Niagara Machine & Tool Works

Presses, Extruding
Farrel Foundry & Machine Co.

Presses, Foot
* Royersford Fdry. & Mach. Co.

Presses, Forming
Farrel Foundry & Machine Co.

Presses, Hydraulic
* Falls Clutch & Machinery Co.
Farrel Foundry & Machine Co.
Mackintosh-Hemphill Co.

Presses, Punching and Trimming
Long & Allstatter Co.
* Niagara Machine & Tool Works
* Royersford Fdry. & Mach. Co.

Presses, Sheet Metal Working
* Niagara Machine & Tool Works

Presses, Toggle
* Niagara Machine & Tool Works

Presses, Wax
* Vogt, Henry Machine Co.

Pressure Gages, Regulators, etc.
(See Gages, Regulators, etc., Pressure)

Producers, Gas
* De La Vergne Machine Co.
* Westinghouse Electric & Mfg. Co.
* Worthington Pump & Mchry. Corp'n

Projectors, Flood Lighting
* Westinghouse Elect. & Mfg. Co.

Propellers
* Morris Machine Works

Pulleys, Friction Clutch
* Allis-Chalmers Mfg. Co.
* Brown, A. & F. Co.
* Falls Clutch & Machinery Co.
Hill Clutch Machine & Fdry. Co.
Johnson, Carlyle Machine Co.
* Jones, W. A. Fdry. & Mach. Co.
Link-Belt Co.
* Medart Co.
* Wood's, T. B. Sons Co.

Pulleys, Iron
* Brown, A. & F. Co.
Chain Belt Co.
* Falls Clutch & Machinery Co.
* Gifford-Wood Co.
Hill Clutch Machine & Fdry. Co.
* Jones, W. A. Fdry. & Mach. Co.
Link-Belt Co.
* Medart Co.
* Wood's, T. B. Sons Co.

Pulleys, Paper
Rockwood Mfg. Co.

Pulleys, Steel
* Medart Co.

Pulleys, Wood
* Medart Co.

Pulverizers
* Brown, A. & F. Co.
* Smidth, F. L. & Co.

Pulverizers, Cement Materials
Pennsylvania Crusher Co.

Pulverizers, Coal
* Furnace Engineering Co.
Grindle Fuel Equipment Co.
Pennsylvania Crusher Co.

Pulverizers, Limestone
Pennsylvania Crusher Co.

Pump Governors, Valves, etc.
(See Governors, Valves, etc. Pump)

Pumping Engines
(See Engines, Pumping)

Pumping Systems, Air Lift
* Ingersoll-Rand Co.

Pumps, Acid
Buffalo Steam Pump Co.
* Ingersoll-Rand Co.
* Nordberg Mfg. Co.
Taber Pump Co.
* Titusville Iron Works Co.

Pumps, Air
* Goulds Mfg. Co.
* Ingersoll-Rand Co.
* Westinghouse Electric & Mfg. Co.
* Wheeler, C. H. Mfg. Co.

Pumps, Ammonia
Buffalo Steam Pump Co.
* Goulds Mfg. Co.
* Ingersoll-Rand Co.
* Vogt, Henry Machine Co.
* Worthington Pump & Machinery Corp'n

Pumps, Boiler Feed
* Allis-Chalmers Mfg. Co.
Bethlehem Shipbldg.Corp'n (Ltd.)
Buffalo Steam Pump Co.
* Coppus Engineering Corp'n
* De Laval Steam Turbine Co.
* Goulds Mfg. Co.
* Ingersoll-Rand Co.
* Kerr Turbine Co.
* Wheeler, C. H. Mfg. Co.
* Worthington Pump & Machinery Corp'n

Pumps, Centrifugal
* Allis-Chalmers Mfg. Co.
Bethlehem Shipbldg.Corp'n (Ltd.)
Buffalo Steam Pump Co.
* Cramp, Wm. & Sons Ship & Engine Bldg. Co.
* De Laval Steam Turbine Co.
* Goulds Mfg. Co.
* Ingersoll-Rand Co.
* Kerr Turbine Co.
Lammert & Mann Co.
* Morris Machine Works
* Nordberg Mfg. Co.
Taber Pump Co.
* Westinghouse Electric & Mfg. Co.
* Wheeler, C. H. Mfg. Co.
* Wheeler Cond. & Engrg. Co.
* Worthington Pump & Machinery Corp'n

Pumps, Condensation
Buffalo Steam Pump Co.
* Ingersoll-Rand Co.
* Wheeler, C. H. Mfg. Co.

Pumps, Deep Well
* Allis-Chalmers Mfg. Co.
* Goulds Mfg. Co.
* Ingersoll-Rand Co.
* Morris Machine Works
* Worthington Pump & Machinery Corp'n

Pumps, Dredging
* Ingersoll-Rand Co.
* Morris Machine Works
* Worthington Pump & Machinery Corp'n

Pumps, Electric
* Allis-Chalmers Mfg. Co.
Buffalo Steam Pump Co.
* Goulds Mfg. Co.
* Ingersoll-Rand Co.
* Morris Machine Works
* Nordberg Mfg. Co.
Taber Pump Co.
* Worthington Pump & Machinery Corp'n

Pumps, Elevator
Buffalo Steam Pump Co.
* Goulds Mfg. Co.
* Worthington Pump & Machinery Corp'n

Pumps, Filter Press
Buffalo Steam Pump Co.
* Goulds Mfg. Co.

Pumps, Hand
* Goulds Mfg. Co.
Taber Pump Co.

Pumps, Hydraulic
* American Fluid Motors Co.
Farrel Foundry & Machine Co.

Pumps, Hydraulic Pressure
Bethlehem Shipbldg.Corp'n (Ltd.)
Buffalo Steam Pump Co.
* Goulds Mfg. Co.
* Ingersoll-Rand Co.
* Morris Machine Works
* Worthington Pump & Machinery Corp'n

Pumps, Measuring
Wayne Tank & Pump Co.

Pumps, Measuring (Gasoline or Oil)
* Bowser, S. F. & Co. (Inc.)

Pumps, Oil
Bethlehem Shipbldg.Corp'n (Ltd.)
* Bowser, S. F. & Co. (Inc.)
Buffalo Steam Pump Co.
* Goulds Mfg. Co.
* Ingersoll-Rand Co.
Lunkenheimer Co.
Nugent, Wm. W. & Co. (Inc.)
Taber Pump Co.
* Worthington Pump & Machinery Corp'n

Pumps, Oil, Force-Feed
Bethlehem Shipbldg.Corp'n(Ltd.)
* Bowser, S. F. & Co. (Inc.)
* Goulds Mfg. Co.
Lunkenheimer Co.

Pumps, Oil (Hand)
* Bowser, S. F. & Co. (Inc.)
* Goulds Mfg. Co.
Lunkenheimer Co.
Nugent, Wm. W. & Co. (Inc.)

Pumps, Power
* Allis-Chalmers Mfg. Co.
Bethlehem Shipbldg.Corp'n(Ltd.)
Buffalo Steam Pump Co.
* Goulds Mfg. Co.
* Ingersoll-Rand Co.
* Nordberg Mfg. Co.
* Wheeler Cond. & Engrg. Co.
* Worthington Pump & Machinery Corp'n

Pumps, Rotary
Fletcher Works
* Goulds Mfg. Co.
Lammert & Mann Co.
Taber Pump Co.

Pumps, Steam
* Allis-Chalmers Mfg. Co.
Buffalo Steam Pump Co.
* Ingersoll-Rand Co.
* Nordberg Mfg. Co.
* Wheeler, C. H. Mfg. Co.
* Wheeler Cond. & Engrg. Co.
* Worthington Pump & Machinery Corp'n

Pumps, Sugar House
* Allis-Chalmers Mfg. Co.
Buffalo Steam Pump Co.
* Goulds Mfg. Co.
* Ingersoll-Rand Co.
* Worthington Pump & Machinery Corp'n

Pumps, Sump
Buffalo Steam Pump Co.
* Goulds Mfg. Co.
* Ingersoll-Rand Co.
* Morris Machine Works
* Smidth, F. L. & Co.
Taber Pump Co.

Pumps, Tank
Buffalo Steam Pump Co.
* Goulds Mfg. Co.
* Ingersoll-Rand Co.
Taber Pump Co.
* Wheeler, C. H. Mfg. Co.
* Wheeler Cond. & Engrg. Co.
* Worthington Pump & Machinery Corp'n

Pumps, Turbine
* Allis-Chalmers Mfg. Co.
Buffalo Steam Pump Co.
* De Laval Steam Turbine Co.
* General Electric Co.
* Goulds Mfg. Co.
* Ingersoll-Rand Co.
* Kerr Turbine Co.
* Morris Machine Works
* Westinghouse Electric & Mfg. Co.
* Worthington Pump & Machinery Corp'n

Pumps, Vacuum
Buffalo Steam Pump Co.
Fletcher Works
* Croll-Reynolds Engrg. Co. (Inc.)
* Goulds Mfg. Co.
* Ingersoll-Rand Co.
Lammert & Mann Co.
* Nordberg Mfg. Co.
* Wheeler, C. H. Mfg. Co.
* Wheeler Cond. & Engrg. Co.
* Worthington Pump & Machinery Corp'n

*Catalogue data of firms marked * appear in the A.S.M.E. Condensed Catalogues of Mechanical Equipment, 1923-24 Volume*

vol. 20, no. 4, Apr. 1924, pp. 244–248, 8 figs. Account of tests undertaken to ascertain what economical results were to be expected from a marine boiler of cylindrical type when air for combustion was preheated, by new form of heater to a degree much higher than had been possible with type of apparatus hitherto used, and to compare this efficiency with that obtained with natural draft. Abstract of paper read before Instn. Engrs. & Shipbldrs. in Scotland.

MARINE STEAM TURBINES

De Laval. Geared Turbine Drive. Pacific Mar. Rev., vol. 21, no. 4, Apr. 1924, pp. 216–217 and 242, 4 figs. Particulars of De Laval compound steam turbine with double-reduction gear, which is to be installed in Southern Pacific single-screw passenger steamer.

MATERIALS

Testing. Strength and Material Testing (Festigkeit und Materialprüfung), P. Ludwik. Zeit. des Vereines deutscher Ingenieure, vol. 68, no. 10, Mar. 8, 1924, pp. 212–214, 6 figs. Difference in strength and notch action in static, dynamic and variable stress. Report from Experimental Engineering Inst. of Vienna Technical High School.

MATERIALS HANDLING

Equipment. Cutting Corners in Material Handling, A. G. J. Rapp. Blast Furnace & Steel Plant, vol. 12, no. 4, Apr. 1924, pp. 12–16, 14 figs. Horizontal conveyors, vertical hoists, tractors, cranes and savings effected by their use.

METAL DRAWING

Shells. Drawing Double-walled Steel Shells, R. B. Hickey. Machy. (N. Y.), vol. 30, no. 8, Apr. 1924, pp. 592–594, 4 figs. Describes dies employed in production of steel shells used in connection with an auxiliary mechanism of an a.c. motor and generally known as "spring barrel tubes," and press operations required in blanking, drawing, redrawing and forming shells.

METALS

Elastic and Fatigue Limits. Elastic and Fatigue Limits in Metals, B. P. Haigh. Birmingham Met. Soc.—Jl., vol. 8, no. 9, Feb. 1924, pp. 412–422 and (discussion) 423–424, 8 figs. partly on supp. plate. Proving and research tests; tensile test as a basis of design; safe stress as a fraction of ultimate tension strength; measurement of fatigue limit; different elastic limits for different kinds of stress.

Impact Resistance. Elastic Impact Resistance of Metals and Alloys (Schlagelastizität von Metallen und Legierungen), Geo. Welter. Zeit. für Metallkunde, vol. 16, no. 1, Jan. 1924, pp. 6–11, 13 figs. In author's opinion elastic behavior of materials under dynamic stress is of greatest importance in dimensioning of machine parts and other constructions; describes new method of determining impact elasticity limit of metals and determines according to this method range of permissible permanent stress for aluminum, electrolytic copper, brass, iron and hardened aluminum alloys; influence of notches is taken into consideration.

Resistance to Wear. A Universal and Practical Machine for Determining the Resistance of Metals to Wear under the Various Kinds of Friction Encountered in Practice, F. P. Hitchcock. Testing, vol. 1, no. 2, Feb. 1924, pp. 147–155, 5 figs. Describes machine which is also suitable for investigation of efficiency of anti-friction metals and of lubricants.

Temperature, Effects of. Summary of the Results obtained from Experiments made during the Years 1918 to 1923 of the Effects of Temperature on the Properties of Metals, A. Mallock. Roy. Soc.—Proc., vol. 105, no. A730, Feb. 1, 1924, pp. 129–134, 6 figs. Study of effects which variations of temperature produce on elasticity and other constants of various metals.

Tension Testing. Tension Testing of Thin Plate Metals, N. S. Otey. Iron Age, vol. 113, no. 14, Apr. 3, 1924, pp. 1008–1009, 5 figs. New test grips claimed to insure accurate results on duralumin and alloy-steel sheets.

Testing. Some Aspects of the Mechanical Testing of Materials, R. T. Rolfe. Birmingham Met. Soc.—Jl., vol. 8, no. 9, Feb. 1924, pp. 385–405 and (discussion) 405–411, 7 figs. partly on supp. plate. Results of investigation carried out on eyebolts; considerations of Izod test in its relation to question of brittleness in mild steel; slag inclusions in forgings and their relation to hardening cracks and failures occurring in service; work-hardening of forgings in service.

MICROSCOPES

Design. Microscopes. Eng. Progress, vol. 5, no. 2, Feb. 1924, pp. 27–29, 3 figs. Physical principles of design; manufacturing difficulties; importance of German industry; special microscopes.

MOLDING MACHINES

Hydraulic vs. Jarring. Hydraulic vs. Jarring Molding Machine (Hydraulische oder Rüttelformmaschine?) V. Zsák. Giesserei-Zeitung, vol. 21, no. 1, Jan. 1, 1924, pp. 1–5, 8 figs. Nature of sand packing with molding press and jarring machine; it is shown that for up to 24-in. boxes only hydraulic molding machines can be used; for boxes from 24 to 40 in. both systems are equally good; for boxes over 40 in. only jarring molding machine can be used.

Selection and Operation. Why Molding Machines? C. W. Miller. Metal Industry (N. Y.), vol. 22, no. 4, Apr. 1924, pp. 146–147. Conditions under which it is advisable to use machines in brass foundry, and when it is poor policy to use them; types best suited to different classes of work; methods of handling and operating to get best results; difficulties which may be encountered and how to overcome them; quality of machine-made castings.

Types. Molding Machines and Molding Practice, R. R. Clarke. Metal Industry (N. Y.), vol. 22, no. 3, Mar. 1924, pp. 100–103, 2 figs. Principles of machine molding and how to distinguish between different types for different classes of work.

MOLDING METHODS

Cylinder Stuffing Box. Molding a L. P. Cylinder Stuffing Box, B. Shaw and J. Edgar. Foundry Trade Jl., vol. 29, no. 395, Mar. 13, 1924, pp. 211–212, 7 figs. Describes successive operations.

Jolt-Ramming. Jolt-Ramming Molding Practice, A. L. Key. Foundry Trade Jl., vol. 29, no. 397, Mar. 27, 1924, pp. 249–251, 8 figs. Describes author's practice. Principles, advantages, types of machines and installations, layout and tackle.

MOLDS

Cast-Steel. Comparison of Cast Steel and Iron Ingot Molds, Fr. Schivetz. Forging—Stamping—Heat Treating, vol. 10, no. 3, Mar. 1924, pp. 123–125. Account of author's experiments with steel ingot molds, from which he concludes that great distrust toward steel molds is not wholly warranted; with properly chosen pouring method and careful observance of all physical properties, favorable economic results can be obtained. Translated from Stahl u. Eisen, Dec. 28, 1922. See reference to original article in Eng. Index 1922, p. 431.

Long-Life. Making Long Life Molds, O. Smalley. Foundry, vol. 52, no. 8, Apr. 15, 1924, pp. 294–297. Details of refractory mixtures which give satisfactory service; record of series of tests under shop conditions; plaster, paper pulp, ganister, carborundum and monazite among materials used.

MONEL METAL

Welding. Welding Monel Metal and Nickel. Welding Engr., vol. 9, no. 3, Mar. 1924, pp. 25 and 28–29, 8 figs. Correct procedure for welding by oxy-acetylene, metallic-arc, carbon-arc and resistance methods.

MOTOR BUSES

Hydraulic Transmission. Hydraulic Transmission for Omnibuses. Engineer, vol. 137, no. 3559, Mar. 14, 1924, p. 292, 1 fig. New system of hydraulic transmission gear which is development of mechanism, devised by same inventor for locomotive work, but modified to suit exigencies of chassis on which it has been fitted.

Removable Top. New Bus with Removable Top is Installed by Fifth Ave. Coach Co. Automotive Industries, vol. 50, no. 11, Mar. 13, 1924, pp. 614–615, 4 figs. Novel covering protects passengers from rain and snow but can be rolled up in fair weather; front and rear are inclosed in glass panels; capacity increased by lengthening upper deck.

32-Volt Systems for. Higher Voltage Systems Suggested for Heavy-Duty Motor Buses, A. M. Dudley and W. E. Menzies. Bus Transportation, vol. 3, no. 4, Apr. 1924, pp. 169–171. Arguments advanced in favor of making 32 volts standard for electrical systems on buses capable of carrying 50 to 60 passengers.

MOTOR-TRUCK TRANSPORTATION

Germany. Truck Transportation Growing Rapidly in Germany, A. Sommer. Automotive Industries, vol. 50, no. 11, Mar. 13, 1924, pp. 627–628. Automotive development hindered by high fuel costs, poor roads, and social unrest; Diesel engines likely to replace present power plants; coöperation of railroads.

MOTOR TRUCKS

Guy Subsidy. The Latest Subsidy Chassis Model. Motor Transport (Lond.), vol. 38, no. 997, Apr. 7, 1924, pp. 419–421, 9 figs. Particulars of new 30-cwt. Guy designed to meet War Office requirements; 25.6-hp. 4-cylinder engine.

Light Delivery. Special Design Features Are Incorporated in Federal Light Delivery Truck. Automotive Industries, vol. 50, no. 15, Apr. 10, 1924, pp. 816–818, 5 figs. Transmission is three-speed-and-reverse sliding pinion type; all four gears on secondary shaft are made in single unit mounted on stationary shaft on flexible roller bearings, equipped with Willys-Knight engine.

Producer-Gas-Driven. The Problem of Producer-Gas-Driven Motor Trucks (Apercu sur l'état actuel de la question des camions à gazogène), M. Chauvierre. Technique Automobile & Aérienne, vol. 15, no. 124, 1924, pp. 8–16, 10 figs. Describes E. T. I. A. and Renault producers; results of tests employing wood and charcoal as fuel; conclusions

Renault. The 17.9 hp. Renaults. Motor Transport (Lond.), vol. 38, no. 997, Apr. 7, 1924, pp. 425–427, 8 figs. Particulars of two freight-carrying chassis for 30-cwt. and 35-cwt. loads respectively and a 20-passenger coach model fitted with 4-wheel brakes.

Trailers. Motor-Truck Trailers (Lastwagenanhänger), C. Kolley. Motorwagen, vol. 27, no. 6, Feb. 29, 1924, pp. 92–95, 5 figs. Describes new type of two-wheel trailer built by Dürkopp Works, Berlin, for their 1½-ton high-speed truck.

O

OIL ENGINES

Airless-Injection. Standardizing Airless-Injection Engines. Motorship, vol. 9, no. 4, Apr. 1924, pp. 270–271, 2 figs. Standardization by Vickers, Ltd., of their 600-b.hp. mercantile 4-stroke oil engine.

Bethlehem. Cubore's New Bethlehem Engine Demonstrated. Motorship, vol. 9, no. 3, Mar. 1924, pp. 195–197, 4 figs. Single-screw vessel of 3500 i.hp. is put into service by Ore Steamship Corp. See also description of new Bethlehem oil engine, pp. 198–202, 16 figs.

The Bethlehem Steel Company's New Oil Engine Shipbldg. & Shipg. Rec., vol. 23, no. 10, Mar. 6, 1924, pp. 275–282, 16 figs. Detailed description of vertical 2-cycle single-acting oil engine, claimed to be first oil engine of all-American design; constructed in units of four, six, or eight cylinders, running at a speed of from 161 r.p.m. for land power and twin-screw marine purpose down to 90 r.p.m. for single-screw marine use. Description of engine as installed on motorship Cubore. See also Mar. Eng. & Shipg. Age, vol. 29, no. 3, Mar. 1924, pp. 161–167, 15 figs.

Developments. Recent Developments in Oil-Engine Practice, J. T. Godfrey and K. W. Merrylees. Roy. Engrs. Jl., vol. 38, no. 1, Mar. 1924, pp. 28–32, 2 figs. Developments in Diesel and semi-Diesel, or heavy-oil engine.

Marine. Some Aspects of the Large Marine Oil Engine, C. J. Hawkes. North-East Coast Instn. Engrs. & Shipbldrs., advance paper, no. 2725S, for meeting Apr. 4, 1924, 15 pp., 3 figs. Deals with questions related to cycle temperatures.

The Utilisation of Waste Heat in Marine Oil Engines. Mar. Engr. & Naval Architect, vol. 47, no. 558, Mar. 1924, pp. 111–114, 6 figs. Theoretical possibilities.

Palmer. The New Palmer Oil Engine. Shipbuilder, vol. 30, no. 164, Apr. 1923, pp. 285–286, 1 fig. Particulars of engine intended for British Tanker Co.'s oil-carrying ship British Aviator; 6-cylinder opposed-piston type working on two-stroke cycle and having a diagonal rod coupling system between top and bottom pistons of adjacent cylinders, giving a double-acting action in reference to each individual crank-pin; 3000 b.hp. at 90 r.p.m.

OIL FUEL

Equipment, Rules for. New Fuel-Oil Rules for New York City. Heat. & Vent. Mag., vol. 21, no. 3, Mar. 1924, pp. 67–71. Amendments adopted by Board of Standards and Appeals, dealing with construction and installations of oil-burning equipment and storage and use of fuel oil.

OPEN-HEARTH FURNACES

Moll End. The Moll End for Open-Hearth Furnaces (Der Moll-Kopf für Siemens-Martin-Oefen), H. Moll. Stahl u. Eisen, vol. 44, no. 8, Feb. 21, 1924, pp. 193–196 and (discussion) 197–202, 2 figs. Describes furnace designed by author; advantages of Moll furnace end; practical results.

OXY-ACETYLENE WELDING

Heavy Plate. Fabricating Heavy Plate by Oxy-Acetylene Welding. Boiler Maker, vol. 24, no. 3, Mar. 1924, pp. 63–67, 19 figs. Construction of two 1000-barrel oil-storage tanks, 125-ft. rotary kiln, and 50,000-cu. ft. gas holder.

P

PAINTS

Colloidal Reaction, Effect of. Phenomena in Paints and Varnishes Induced by Colloidal Reactions, H. A. Gardner. Paint Mfrs.' Assn. of U. S.—Sci. Section; no. 200, Mar. 1924, pp. 279–293. Wetting and grinding phenomena; texture of pigments; absorption phenomena; plasticity and yield value; electrical charge on pigments; viscosity and surface-tension effects, etc.

Protective Properties. The Protective Properties of Paint, W. T. Pearce. Chem. & Met. Eng., vol. 30, no. 12, Mar. 24, 1924, pp. 463–467, 10 figs. Scientific investigations at North Dakota Agricultural College; formulation of test paints; factors affecting durability.

PAPER MANUFACTURE

Chromo Paper. Special Moistening of Chromo Paper, E. Arnould. Paper Trade Jl., vol. 78, no. 14, Apr. 3, 1924, pp. 79–80. Notes on manufacture of chromo paper; moistening of paper as it is being reeled. Translated from Revue Universelle de la Papeterie et de l'Imprimerie, Dec. 14–16, 1923.

Driers, Vacuum. The Vacuum Paper Machine Dryer, O. Minton. Paper Mill, vol. 48, no. 15, Apr. 12, 1924, pp. 90, 92, 94, 96, 98, 100, 102, 104, 132, 134, 136, 138 and 140. Historical review; mechanical considerations; operation; theoretical considerations; mill data. This method of drying paper is revolutionary improvement in art of paper making, second only to advent of Fourdrinier paper machine.

Minerals and Chemicals Used. The Non-Metallic Minerals and Chemicals Used in the Pulp and Paper Industry, L. H. Cole. Can. Min. Jl., vol. 45, nos. 7, 10 and 11, Feb. 15, Mar. 7 and 14, 1924, pp. 158–160, 236–239 and 258–261, 2 figs. Indicates where the different minerals and chemicals are being obtained, process of their manufacture, and possibilities of their being procured in commercial quantities in Canada.

Sizing. The Asa Process, E. Westarp. Paper Trade Jl., vol. 78, no. 14, Apr. 3, 1924, p. 77. Consists in the use of a chemical agent which, on addition to glue, transforms it into a gel which can be ground and added to furnish in beater; is cheaper and simpler than other sizing processes and eliminates use of surface sizing but gives same results.

The Sizing of Paper, L. P. Zhereboff. Paper Trade Jl., vol. 78, no. 13, Mar. 27, 1924, pp. 45–53, 6 figs. Review of latest books on papermaking; results of study on rosin.

Wood Pulp, Measurement of. Weight of Wood and Quantity of Pulp, R. Sieber. Paper, vol. 33, no. 21, Mar. 13, 1924, pp. 7–10, 5 figs. Deals with measuring pulpwood by weight instead of volume. Amount of moisture in wood influences yield of pulp, capacity of digester being affected. Results of investigations

Manufactured by Advertisers

CLASSIFIED LIST OF MECHANICAL EQUIPMENT

Alphabetical List on page 156

Punches, Multiple
* Long & Allstatter Co.
Mackintosh-Hemphill Co.

Punches, Power
* Niagara Machine & Tool Works
* Royersford Fdry. & Mach. Co

Punches and Dies
* Royersford Fdry. & Mach. Co.

Punching and Coping Machines
* Long & Allstatter Co.

Punching and Shearing Machines
* Long & Allstatter Co.
* Royersford Fdry. & Mach. Co.

Purifiers, Ammonia
* Frick Co. (Inc.)

Purifiers, Oil
* Bowser, S. F. & Co. (Inc.)
Elliott Co.
Nugent, Wm. W. & Co. (Inc.)

Purifying and Softening Systems Water
International Filter Co.
* Scaife, Wm. B. & Sons Co.

Pyrometers, Electric
* American Schaeffer & Budenberg Corp'n
* Bristol Co.
* Crosby Steam Gage & Valve Co.
* Superheater Co.
* Taylor Instrument Cos.

Pyrometers, Expansion Stem
* Tagliabue, C. J. Mfg. Co.

Pyrometers, Optical
* Taylor Instrument Cos.

Pyrometers, Pneumatic
* Uehling Instrument Co.

Pyrometers, Radiation
* Taylor Instrument Cos.

Racks, Machine, Cut
* James, D. O. Mfg. Co.
* Jones, W. A. Fdry. & Mach. Co.
Nuttall, R. D. Co.

Radiators, Steam and Water
* American Radiator Co.
* Smith, H. B. Co.

Railways, Industrial
Easton Car & Construction Co.
Link-Belt Co.

Rams, Hydraulic
* Goulds Mfg. Co.
* Worthington Pump & Machinery Corp'n

Receivers, Air
* Ingersoll-Rand Co.
* Scaife, Wm. B. & Sons Co.
* Walsh & Weidner Boiler Co.
* Wheeler Cond. & Engrg. Co.
* Worthington Pump & Machinery Corp'n

Receivers, Ammonia
* Frick Co. (Inc.)

Recorders, CO
* Tagliabue, C. J. Mfg. Co.
* Uehling Instrument Co.

Recorders, CO_2
* Tagliabue, C. J. Mfg. Co.
* Uehling Instrument Co.

Recorders, SO_2
* Tagliabue, C. J. Mfg. Co.
* Uehling Instrument Co.

Recording Instruments
(See Instruments, Recording)

Reducing Motions
* Crosby Steam Gage & Valve Co.

Refractories
* Drake Non-Clinkering Furnace Block Co.
Keystone Refractories Co.
* King Refractories Co. (Inc.)
Maphite Sales Corp'n

Refrigerating Machinery
* De La Vergne Machine Co.
* Frick Co. (Inc.)
* Ingersoll-Rand Co.
Johns-Manville (Inc.)
* Nordberg Mfg. Co.
* Vilter Mfg. Co.
* Vogt, Henry Machine Co.
* Westinghouse Electric & Mfg. Co.

Regulators, Automatic Arc-Furnace
* Westinghouse Elect. & Mfg. Co.

Regulators, Blower
* Foster Engineering Co.
* Mason Regulator Co.

Regulators, Condensation
* Tagliabue, C. J. Mfg. Co.

Regulators, Damper
* Coppus Engineering Corp'n
* Fulton Co.
* Kieley & Mueller (Inc.)
* Mason Regulator Co.

Regulators, Electric
* General Electric Co.
* Westinghouse Electric & Mfg. Co.

Regulators, Fan Engine
* Foster Engineering Co.

Regulators, Feed Water
* Edward Valve & Mfg. Co.
Elliott Co.
* Kieley & Mueller (Inc.)
Squires, C. E. Co.

Regulators, Flow (Steam)
* Schutte & Koerting Co.

Regulators, Humidity
* Fulton Co.
* Tagliabue, C. J. Mfg. Co.

Regulators, Hydraulic Pressure
* Foster Engineering Co.
* Mason Regulator Co.

Regulators, Liquid Level
* Tagliabue, C. J. Mfg. Co.

Regulators, Pressure
* Edward Valve & Mfg. Co.
* Foster Engineering Co.
* Fulton Co.
* General Electric Co.
* Kieley & Mueller (Inc.)
* Mason Regulator Co.
* Tagliabue, C. J. Mfg. Co.
* Taylor Instrument Cos.

Regulators, Pump
(See Governors, Pump)

Regulators, Temperature
* Bristol Co.
* Fulton Co.
* Kieley & Mueller (Inc.)
* Sarco Co. (Inc.)
* Tagliabue, C. J. Mfg. Co.
* Taylor Instrument Cos.

Regulators, Time
* Tagliabue, C. J. Mfg. Co.

Regulators, Vacuum
* Foster Engineering Co.

Reservoirs, Aerating
* Spray Engineering Co.

Resistance Material (Electrical)
Driver-Harris Co.

Revolution Counters
(See Counters, Revolution)

Rings, Weldless
Cann & Saul Steel Co.

Rivet Heaters, Electric
* General Electric Co.

Riveters, Hydraulic
Mackintosh-Hemphill Co.

Riveters, Pneumatic
* Ingersoll-Rand Co.

Riveting Machines
* Long & Allstatter Co.

Roller Bearings
(See Bearings, Roller)

Rolling Mill Machinery
Farrel Foundry & Machine Co
Mackintosh-Hemphill Co.
Treadwell Engineering Co.

Rolls, Bending
* Niagara Machine & Tool Works

Rolls, Crushing
Farrel Foundry & Machine Co.
Link-Belt Co.
* Worthington Pump & Machinery Corp'n

Rolls, Rubber
* Goodrich, B. F. Rubber Co.
* United States Rubber Co.

Rolls, Steel
Mackintosh-Hemphill Co

Roofing
Johns-Manville (Inc.)

Roofing, Asbestos
Johns-Manville (Inc.)

Rope, Hoisting
Clyde Iron Works Sales Co.
* Roebling's, John A. Sons Co.

Rope, Transmission
Hill Clutch Machine & Fdry. Co.
Link-Belt Co.
* Roebling's, John A. Sons Co.

Rope, Wire
Clyde Iron Works Sales Co.
Hill Clutch Machine & Fdry. Co.
* Roebling's, John A. Sons Co.

Rope Drives
* Allis-Chalmers Mfg. Co.
* Brown, A. & F. Co.
* Falls Clutch & Machinery Co.
Hill Clutch Machine & Fdry. Co.
Link-Belt Co.
* Medart Co.
* Wood's, T. B. Sons Co.

Rubber Goods, Mechanical
* Goodrich, B. F. Rubber Co.
* Jenkins Bros.
* United States Rubber Co.

Rubber Mill Machinery
Farrel Foundry & Machine Co.

Sand Blast Apparatus
* De La Vergne Machine Co.

Saw Mill Machinery
* Allis-Chalmers Mfg. Co.

Saw Mills, Portable
* Frick Co. (Inc.)

Scales, Fluid Pressure
* Crosby Steam Gage & Valve Co.

Screens, Perforated Metal
* Hendrick Mfg. Co.

Screens, Revolving
* Allis-Chalmers Mfg. Co.
Chain Belt Co.
* Gifford-Wood Co.
* Hendrick Mfg. Co.
Link-Belt Co.
* Smidth, F. L. & Co.

Screens, Shaking
* Allis-Chalmers Mfg. Co.
Chain Belt Co.
* Gifford-Wood Co.
* Hendrick Mfg. Co.
Link-Belt Co.

Screens, Water Intake (Traveling)
Chain Belt Co.
Link-Belt Co.

Screw Cutting Dies
(See Dies, Thread Cutting)

Screw Machines, Hand
* Jones & Lamson Mch. Co.
* Warner & Swasey Co.

Screws, Cap
* Scovill Mfg. Co.

Screws, Safety Set
Allen Mfg. Co.
* Bristol Co.

Screws, Set
Allen Mfg. Co.

Separators, Ammonia
* De La Vergne Machine Co.
Elliott Co.
* Frick Co. (Inc.)
* United Machine & Mfg. Co.
* Vogt, Henry Machine Co.

Separators, Compressed Air
* United Machine & Mfg. Co.

Separators, Oil
Bethlehem Shipbldg.Corp'n (Ltd.)
* Cochrane Corp'n
* Crane Co.
* De La Vergne Machine Co.
Elliott Co.
Hoppes Mfg. Co.
* Kieley & Mueller (Inc.)
* United Machine & Mfg. Co.
* Vogt, Henry Machine Co.

Separators, Steam
* Cochrane Corp'n
* Crane Co.
Elliott Co.
Hoppes Mfg. Co.
* Kieley & Mueller (Inc.)
* Pittsburgh Valve, Fdry. & Const. Co.
* United Machine & Mfg. Co.
* Vogt, Henry Machine Co.

Shafting
* Allis-Chalmers Mfg. Co.
* Brown, A. & F. Co.
Cumberland Steel Co.
* Falls Clutch & Mchry. Co.
* Medart Co.
Union Drawn Steel Co.
* Wood's, T. B. Sons Co.

Shafting, Cold Drawn
Hill Clutch Machine & Fdry. Co.
* Medart Co.

Shafting, Flexible
* Gwilliam Co.

Shafting, Turned and Polished
Cumberland Steel Co.
Hill Clutch Machine & Fdry. Co.
Link-Belt Co.

Shapes, Brick
* McLeod & Henry Co.

Shapes, Cold Drawn Steel
Union Drawn Steel Co.

Shears, Alligator
Farrel Foundry & Machine Co.
* Long & Allstatter Co.
* Royersford Foundry & Machine Co.

Shears, Hydraulic
Mackintosh-Hemphill Co.

Shears, Plate
* Long & Allstatter Co.
Mackintosh-Hemphill Co.

Shears, Rotary
* Niagara Machine & Tool Works

Sheaves, Rope
* Brown, A. & F. Co.
Clyde Iron Works Sales Co.
* Falls Clutch & Machinery Co.
Hill Clutch Machine & Fdry. Co.
* Jones, W. A. Fdry. & Mach. Co.
Link-Belt Co.
Mackintosh-Hemphill Co.
* Medart Co.
* Nordberg Mfg. Co.
* Wood's, T. B. Sons Co.

Sheet Metal Work
* Allington & Curtis Mfg. Co.
* Hendrick Mfg. Co.

Sheet Metal Working Machinery
Farrel Foundry & Machine Co.
* Niagara Machine & Tool Works

Sheets, Brass
* Scovill Mfg. Co.

Sheets, Bronze
* Hendrick Mfg. Co.

Sheets, Rubber, Hard
* Goodrich, B. F. Rubber Co
* United States Rubber Co.

Siphons (Steam-Jet)
* Schutte & Koerting Co.

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Dietzgen, Eugene Co.
Keuffel & Esser Co.
New York Blue Print Paper Co.
ParVell Laboratories
U. S. Blue Co.
Weber, F. Co. (Inc.)

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* Sarco Co. (Inc.)

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(See Stacks, Steel)

Sockets, Wire Rope
(See Wire Rope Fastenings)

Soot Blowing Systems
Diamond Power Specialty Corp'n

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* Builders Iron Foundry
* Cramp, Wm. & Sons Ship & Engine Bldg. Co.
DuPont Engineering Co.
Farrel Foundry & Machine Co.
* Fawcus Machine Co.
* Franklin Machine Co.
Hill Clutch Machine & Fdry. Co.
Lammert & Mann
Mackintosh-Hemphill Co.
* Nordberg Mfg. Co.
* Smidth, F. L. & Co.
* Vilter Mfg. Co.

Speed Reducing Transmissions
* Cleveland Worm & Gear Co.
* De Laval Steam Turbine Co.
* General Electric Co.
* James, D. O. Mfg. Co.
* Jones, W. A. Fdry. & Mach. Co.
Link-Belt Co.
Palmer-Bee Co.

Spray Cooling Systems
* Cooling Tower Co. (Inc.)
* Spray Engineering Co.

Sprays, Water
* Cooling Tower Co. (Inc.)
* Spray Engineering Co.

Sprinkler Systems
Rockwood Sprinkler Co.

Sprinklers, Spray
* Cooling Tower Co. (Inc.)
* Spray Engineering Co.

Sprockets
Baldwin Chain & Mfg. Co.
* Diamond Chain & Mfg. Co.
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Link-Belt Co.
* Medart Co.
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* Vogt, Henry Machine Co.
* Walsh & Weidner Boiler Co.

Stair Treads
* Irving Iron Works Co.

Stampings, Sheet Metal
Rockwood Sprinkler Co.

*Catalogue data of firms marked * appear in the A.S.M.E. Condensed Catalogues of Mechanical Equipment, 1923-24 Volume.*

Translated from Svensk Pappers-Tidning, 15 and 17, 1923.

PIPE

Bending. Pipe Bending, Johnstone-Taylor. Boiler Maker, vol. 24, no. 3, Mar. 1924, p. 81, 1 fig. Brief review of Bonn system developed in England and scope of its application.

PISTON RINGS

Calculation and Production. A New Method of Calculation and Production of Spring Rings (Ein neues Verfahren zur Berechnung und Anfertigung selbstspannender Kolbenringe), O. Pollert. Zeit. des Vereines deutscher Ingenieure, vol. 68, no. 11, Mar. 15, 1924, pp. 253–254, 2 figs. Discusses some well-known methods of making pistion rings and describes new method developed in Sweden by R. Bennet, and gives results of tests.

PLATES

Deformations and Stresses. Deformations and Stresses of Continuous Plates (Die Formänderungen und die Spannungen von durchlaufenden Platten), A. Nádai. Bauingenieur, vol. 5, no. 5, Mar. 15, 1924, pp. 102–107, 5 figs. Calculation of deformation and stress in slabs which have individual loads at regularly arranged points.

Perforated, Stresses in. On Stresses in a Plate with a Circular Hole, S. Timoshenko. Franklin Inst.—Jl., vol. 197, no. 4, Apr. 1924 pp. 505–516, 6 figs. Method of approximating influence of beads, used to reinforce holes, on local stresses.

PRESSES

Classification. Classification of Power Presses, F. R. Daniels. Machy. (N. Y.), vol. 30, no. 8, Apr. 1924, pp. 617–618, 7 figs. Advocates classification by style of frame, because use to which a press may be put and method of moving gate may be varied; describes machines built by Waterbury Farrel Foundry & Machine Co., Waterbury, Conn., the names given them being those applied by this company.

Ejectors for. Ejectors for Punches and Dies, H. M. Groff. Machy. (N. Y.), vol. 30, no. 8, Apr. 1924, pp. 608–609, 3 figs. Describes different devices employed for ejecting parts from punches and dies of power presses.

Inclinable. Design of Inclinable Power Presses, P. A. Friedell. Machy. (N. Y.), vol. 30, no. 8, Apr. 1924, pp. 626–628, 1 fig. Calculations for designing gearing, driving shaft, back-shaft bearing, flywheel and pulleys.

PRODUCER GAS

Factory Power and Heating. Gas for Power and Heating. Power Engr., vol. 19, no. 216, Mar. 1924, pp. 99–105, 12 figs. Describes Raleigh's Cycle Co.'s power and heating plant; factory uses suction and producer gas for whole of its heat-treatment processes, and as fuel for its prime movers.

PULLEYS

Pressed Metal, Manufacture. Redesigning a Pressed Metal Pulley, E. Panek. Forging—Stamping—Heat Treating, vol. 10, no. 3, Mar. 1924, pp. 129–130, 8 figs. Eight operations eliminated in manufacture of pulley by change of design and addition of one more part; strength and appearance materially improved.

PULVERIZED COAL

Boiler Firing. Burning Low-Grade Fuels in Pulverized Form, E. K. Scott. Colliery Guardian, vol. 127, no. 3297, Mar. 7, 1924, pp. 607–608 (includes discussion). Particulars of some of the largest boilers in world designed for working with pulverized fuel firing on Lopulco system; particulars of power stations in France and Belgium which are being equipped with boilers to burn pulverized fuel; application to colliery boilers; colliery coal dust as pulverized fuel. Paper read before Coke Oven Mgrs.' Assn.

Combustion. Experimental Investigation of the Combustion of Pulverized Coal (Étude expérimentale de la combustion du charbon pulvérizé), E. Audibert. Revue de l'Industrie Minérale, no. 73, Jan. 1, 1924, pp. 1–32, 16 figs. Points out that primary reason for large combustion chambers is abnormal temperature otherwise reached by brickwork; it is suggested that combustion chamber should be in two compartments, viz., an ignition chamber of very refractory bricks, impermeable to heat, and main combustion chamber with walls permeable to heat; heat passing through latter could be recovered by means of water jacket through which passes feedwater.

PUMPING ENGINES

Holland. Modern Pumping Engines in Holland J. C. Dijshoorn. Engineering, vol. 117, no. 3040, Apr. 4, 1924, pp. 446–448, 5 figs. Describes representative installations of modern practice and considerations involved in design. (Abstract.) Paper read before Instn. Engrs. & Shipbldrs. in Scotland.

PUMPS

Speed of Absorption. Contributions to the Theory of Pumps and Compressors (Beiträge zur Theorie von Pumpen und Kompressoren), E. Altenkirch. Zeit. für technische Physik, vol. 5, no. 2, 1924, pp. 44–52, 7 figs. Study of phenomenon of absorption of air from spaces in which liquids can penetrate leads to conclusion that velocity of absorption for low suction heads increases with increasing vacuum, with smaller clearance space more rapidly than with larger.

PYROMETERS

Optical. The Optical Pyrometer as a Brightness Photometer, W. E. Forsythe. Franklin Inst.—Jl., vol. 197, no. 4, Apr. 1924, pp. 517–525, 4 figs. Points out that disappearing filament pyrometer, with red-green glass in eyepiece, has been found very satisfactory as photometer for measuring brightness of different surfaces that were difficult to measure by ordinary means.

PYROMETRY

Fundamental Principles. Non-Technical Discussion on Pyrometry, G. C. McCormick. Forging—Stamping—Heat Treating, vol. 10, nos. 1 and 2, Jan. and Feb., 1924, pp. 38–39 and 72–74. Fundamental principles reduced to terms within understanding of layman; frequent checking of couples and instruments essential.

Steel Works. General Phases of Pyrometry and Temperature Control in the Steel Industry, O. Brewer. Iron & Steel Engr., vol. 1, no. 3, Mar. 1924, pp. 116–123 and (discussion) 123–127, 8 figs. Deals with instruments for indicating, recording and controlling temperatures, and their application to blast furnace, open hearth, soaking pits, rolling mill, etc.

R

RADIATORS

Traps. Operating Characteristics of Radiator Traps. Heat. & Vent. Mag., vol. 21, no. 4, Apr. 1924, pp. 57–60, 5 figs. What heating industry should expect of these devices in way of performancy. Symposium based upon recent tests conducted by Nat. Assn. Bldg. Owners and Mgrs.

RAILS

Failures. High Rail Failure Record for 1917 Rollings. Iron Age, vol. 113, no. 12, Mar. 20, 1924, pp. 851–852. Data from records of rail failures made public by rail committee of Am. Ry. Eng. Assn. Electric welding in steel fabrication.

Old, Rerolling into Rods. Rerolling Old Railroad Rails Into Rods, A. Noell. Iron Age, vol. 113, no. 12, Mar. 20, 1924, pp. 866–869, 10 figs. Methods of operation in rolling with oblique pressure; reduction of sectional area in rolling; influence of steel strength. (Abstract.) Translated from Stahl u. Eisen.

RAILWAY OPERATION

Express-Train Resistance. The Resistance of Express Trains, C. F. D. Marshall. Ry. Engr., vol. 45, no. 531, Apr. 1924, pp. 133–137, 3 figs. Natural wind; effect of direct wind; effect of wind gusts on. frontal pressure; limiting speeds.

Freight Rolling-Stock Distribution and Control. Increasing the Mobility of Freight Rolling-Stock. Ry. Gaz., vol. 40, no. 11, Mar. 14, 1924, pp. 363–374, 19 figs. Lond. & North East. Ry. now control distribution of whole of their freight rolling stock from a central control office at York, working through 24 district superintendents' offices and 120 sub-control stations. Explains means by which economy in wagon movement is effected and mobility of freight rolling stock increased.

Freight-Train Delays, Cost of. What Is Cost of Freight Train Delays? Ry. Age, vol. 76, no. 19, Apr. 12, 1924, pp. 925–926. Committee of signal section, Am. Ry. Assn., analyzes charges and fixes average at $21.07 per hr.

Loaded Car Movement, Delays. Some Causes of Delay to Loaded Car Movement, R. A. Munsch. Ry. Rev., vol. 74, no. 15, Apr. 12, 1924, pp. 681–683. Analyzes delays for which shipper is primarily responsible and for which agent is responsible.

Train Control. Making Brake Tests for Train Control, C. B. Miles. Ry. Signaling, vol. 17, no. 3, Mar. 1924, pp. 98–100, 4 figs. Relation of air brake to signal engineering from standpoint of air-brake engineer. Methods of making tests.

Train Control Air Devices Improved. Ry. Signaling, vol. 17, no. 4, Apr. 1924, pp. 162–164, 3 figs. Indiana Equipment Corp. develops valves to give graduated reduction of brake pipe pressure.

Train Control Test Engine on the U. P. Ry. Signaling, vol. 17, no. 3, Mar. 1924, pp. 102–103, 5 figs. Describes equipment of locomotive fitted by Union Pacific with three types of control equipment to determine device best suited to its conditions; installation made so that locomotive could be operated over adjacent territory on which the three types of road apparatus were installed.

RAILWAY REPAIR SHOPS

Locomotive, Welding Standardization. Welding Standardization in Locomotive Shops, J. S. Heaton. Ry. Mech. Engr., vol. 98, nos. 3 and 4, Mar. and Apr. 1924, pp. 176–178 and 231–234, 5 figs. Review of the various methods used on boilers, fireboxes, running gear, cylinders and reclamation work; proper care of equipment.

RAILWAY SHOPS

Machine Tools, Application of Modern. How Modern Machine Tools Cut Costs. Elec. Ry. Jl., vol. 63, no. 12, Mar. 22, 1924, pp. 444–454, 29 figs. Practices of some shops in application of modern machine tools and methods to electric railway work. How multiple cutting lathes reduce cost of axle machining; improvements in wheel lathes and boring mills; special machines used in bearing work; etc.

Piecework Production in. Piecework Production as Applied to Electric Railways. E. C. Parham. Elec. Traction, vol. 20, no. 3, Mar. 1924, pp. 124–125. How piecework is checked and recorded to derive most beneficial results from this production method.

Woodworking Machines. Wood-Working Plant for Railway Carriage and Wagon Building. Ry. Engr., vol. 45, no. 529, Feb. 1924, pp. 61–64, 9 figs. Describes mortising, boring, tenoning and other machines.

RAILWAY SIGNALING

Automatic, for Grade Crossing. Automatic Interlocker for a Crossing. Ry. Signaling, vol. 17, no. 4, Apr. 1924, pp. 165–168, 3 figs. Satisfactory for thin traffic; home and distant signals arranged on "normal danger" plan.

Automatic Block. A. C. Supply with Battery Reserve for Automatic Block Signaling, H. G. Morgan. Ry. Signaling, vol. 17, no. 4, Apr. 1924, pp. 158–160, 1 fig. Discusses use of commercial power for railway signaling with emergency reserve battery; application of floating system on terminals; transmission for systems requiring more power; systems using power for all functions; signals lighted electrically. Paper presented before Signal Section, Am. Ry. Assn.

Report on A. C. Block Signaling. Ry. Signaling, vol. 17, no. 3, Mar. 1924, pp. 126–128. Report of Am. Ry. Assn. committee on necessary modification of a. c. track circuits in detail or in principle to insure reliable protection of motor buses and motor cars, and availability of rectifiers for signal systems.

Direct-Current. Report of Committee on D. C. Signaling. Ry. Signaling, vol. 17, no. 3, Mar. 1924, pp. 132–133. Report of Am. Ry. Assn. committee. Instructions for testing resistance of switch circuit controller, shunting circuits and contacts; maximum resistance for switch circuit controllers, shunting circuits and contacts; specification for bonding track circuits.

Light Signals. D. C. and A. C. Power for Light Signals, L. S. Dunham. Ry. Signaling, vol. 17, no. 3, Mar. 1924, pp. 113–115. Reliable, economical operation to be derived by different combinations of primary battery and a.c. supply.

115 Miles of Light Signals on Santa Fe, E. Winans. Ry. Signaling, vol. 17, no. 4, Apr. 1924, pp. 155–157, 8 figs. Electrically lighted switch lamps and pumping-station motor are fed from transmission line. See also Ry. Age, vol. 76, no. 17, Mar. 29, 1924, pp. 843–844, 2 figs.

Points Operation, Automatic. Automatic Operation of Railway Points. Ry. Engr., vol. 44, no. 527, Dec. 1923, pp. 473–474, 1 fig. Describes automatic signaling arrangement on Mersey Ry., England, first installation in world where trains make their own point movements; this allows for two signal boxes to be closed.

Single Lines. Economies on Single Lines. Ry. Engr., vol. 45, no. 530, Mar. 1924, pp. 91–94, 6 figs. Single lines are more costly to signal and to man than double lines of equal or slightly higher traffic density, because of necessary stopping places which, generally, have a layout and signaling altogether out of porportion to ordinary traffic demands of locality. Describes how some of this cost may be reduced.

Storage-Battery Maintenance and Operation. Report of Committee on Instruction. Ry. Signaling, vol. 17, no. 3, Mar. 1924, pp. 130–131, 1 fig. Report of Am. Ry. Assn. committee giving instructions on installation, maintenance and operation of storage batteries of both lead and nickel alkaline types, and care and installation of insulated wire.

Telegraph and Telephone Practice. Telegraph and Telephone Practice, Chas. S. Rhoads. Ry. Signaling, vol. 17, no. 4, Apr. 1924, pp. 173–175, 12 figs. West. Elec. Co. developments of selectors, group type, intercalling and time sending.

RAILWAY TIES

Preservative Treatment. Improving Method of Treating Ties with Zinc Chloride, J. D. MacLean. Ry. Eng. & Maintenance, vol. 20, no. 4, Apr. 1924, pp. 160–162, 4 figs., 3 tables. Experiments show way to improve treatment, reduce fuel consumption and increase plant output.

RAILWAY TRACK

Constituents, Manufacture of. The Production of Iron and Steel for Railway Purposes, C. J. Allen. Ry. Engr., vol. 44, no. 527, Dec. 1923, pp. 453–456 and 465, 9 figs. Manufacture of fishplates, steel sleepers, corrugated sheets, slag bricks and concrete, and miscellaneous equipment, at Cleveland Steelworks of Bolckow, Vaughan & Co. Ltd.

Crossings. Report on Highway Crossing Protection. Ry. Signaling, vol. 17, no. 3, Mar. 1924, pp. 123–125, 2 figs. Report of Am. Ry. Assn. committee on requisites for automatic signals used for highway crossing protection, transmission values, reflectors, circuits, code on colors for traffic signals.

Depression and Elevation, Combination. C. & N. W. Ry. Depresses Busy Main Line at Milwaukee. Eng. News-Rec., vol. 92, no. 14, Apr. 3, 1924, pp. 570–574, 8 figs. Grade-crossing elimination improves operating conditions; new four-track line; one running track maintained during work; three types of monolithic and precast concrete walls.

Rail Laying, by Machine. Laying Rail with a Machine in India. Ry. Eng. & Maintenance, vol. 20, no. 4, Apr. 1924, pp. 157–159, 4 figs. Labor-saving equipment which may be applied to advantage even where wages are extremely low.

Platelaying with the Anderson Rail Conveyor. Ry. Engr., vol. 45, no. 529, Feb. 1924, pp. 58–60, 5 figs. Account of track-laying work carried out on Bengal-Nagpur Ry. in India with aid of a simple machine invented by A. T. D. Anderson; description of machine.

Renewal. Getting the Maximum Service from Rail, B. M. Cheney. Ry. Eng. & Maintenance, vol. 20, no. 4, Apr. 1924, pp. 145–148. Analysis of various factors that determine when rail must be replaced.

RAILWAYS

Future Traffic Forecast. Forecasting Future Volume of Railway Traffic L. E. Peabody. Ry. Age, vol. 76, no. 18, Apr. 5, 1924, pp. 899–900. Consideration of Blood's formula is said to lead to estimates that are too large; original article by J. B. Blood was printed in same journal (Feb. 9, 1923, p. 369).

Manufactured by Advertisers — CLASSIFIED LIST OF MECHANICAL EQUIPMENT

Alphabetical List on page 156

Standpipes
* Cole, R. D. Mfg. Co.
Morrison Boiler Co.
* Walsh & Weidner Boiler Co.

Static Condensers
* Westinghouse Elect. & Mfg. Co.

Steam Specialties
* Crane Co.
* Foster Engineering Co
* Fulton Co.
* Kieley & Mueller (Inc.)
Lunkenheimer Co.
* Pittsburgh Valve, Fdry. & Const. Co.
* Sarco Co. (Inc.)

Steel, Alloy
Cann & Saul Steel Co.
Union Drawn Steel Co.

Steel, Bar
Cann & Saul Steel Co.

Steel, Bright Finished
Union Drawn Steel Co.

Steel, Cold Drawn
Union Drawn Steel Co.

Steel, Cold Rolled
Cumberland Steel Co
Union Drawn Steel Co.

Steel, Nickel
Union Drawn Steel Co

Steel, Open-Hearth
* Falk Corporation
Union Drawn Steel Co.

Steel, Rock Drill
* Ingersoll-Rand Co.

Steel, Screw, Cold Drawn
Union Drawn Steel Co.

Steel, Strip (Cold Rolled)
Driver-Harris Co.

Steel, Tool
Cann & Saul Steel Co.

Steel, Vanadium
Union Drawn Steel Co.

Steel Plate Construction
Bethlehem Shipbldg.Corp'n (Ltd.)
* Bigelow Co.
* Burhorn, Edwin Co.
* Casey-Hedges Co.
* Cole, R. D. Mfg. Co.
* Graver Corp'n
* Hendrick Mfg. Co.
* Keeler, E. Co.
Morrison Boiler Co.
Steere Engineering Co.
* Titusville Iron Works Co.
* Union Iron Works
* Vogt, Henry Machine Co.
* Walsh & Weidner Boiler Co.

Steps, Ladder & Stair (Non-Slipping)
* Irving Iron Works Co.

Stills
* Vogt, Henry Machine Co.

Stocks and Dies
* Landis Machine Co. (Inc.)

Stokers, Chain Grate
* Babcock & Wilcox Co.
* Combustion Engineering Corp'n
* Westinghouse Electric & Mfg. Co.

Stokers, Overfeed
* Detroit Stoker Co.
* Riley, Sanford Stoker Co.
* Westinghouse Electric & Mfg. Co.

Stokers, Traveling Grate, Anthracite
* United Machine & Mfg. Co.

Stokers, Underfeed
* American Engineering Co.
* Combustion Engineering Corp'n
* Detroit Stoker Co.
* Riley, Sanford Stoker Co.
* Sturtevant, B. F. Co.
* United Machine & Mfg. Co.
* Westinghouse Electric & Mfg. Co.

Strainers, Oil
* Bowser, S. F. & Co. (Inc.)
* Mason Regulator Co.

Strainers, Steam
* Foster Engineering Co.
* Kieley & Mueller (Inc.)
* Mason Regulator Co.

Strainers, Water
Elliott Co.
* Foster Engineering Co.
* Kieley & Mueller (Inc.)
* Mason Regulator Co.
* Schutte & Koerting Co.

Strainers, Water (Traveling)
Link-Belt Co.

Structural Steel Work
* Hendrick Mfg. Co.
* Walsh & Weidner Boiler Co.

Sugar Machinery
Farrel Foundry & Machine Co.
* Walsh & Weidner Boiler Co.

Superheaters, Steam
* Babcock & Wilcox Co.
* Power Specialty Co.
* Superheater Co.

Superheaters, Steam (Locomotive)
* Power Specialty Co.
* Superheater Co.

Superheaters, Steam (Marine)
* Power Specialty Co.
* Superheater Co.

Switchboards
* General Electric Co.
* Westinghouse Electric & Mfg. Co.

Switches, Electric
* General Electric Co.
* Westinghouse Electric & Mfg. Co.

Synchronous Converters
(See Converters, Synchronous)

Tables, Drawing
Dietzgen, Eugene Co.
Economy Drawing Table & Mfg. Co.
Keuffel & Esser Co.
New York Blue Print Paper Co.
ParVell Laboratories
U. S. Blue Co.
Weber, F. Co. (Inc.)

Tachometers
* American Schaeffer & Budenberg Corp'n
* Bristol Co.
Veeder Mfg. Co.

Tachoscopes
* American Schaeffer & Budenberg Corp'n

Tanks, Acid
* Graver Corp'n
* Walsh & Weidner Boiler Co.

Tanks, Ice
* Frick Co. (Inc.)
* Graver Corp'n

Tanks, Oil
* Graver Corp'n
* Hendrick Mfg. Co.
Morrison Boiler Co.
Nugent, Wm. W. & Co. (Inc.)
* Scaife, Wm. B. & Sons Co.
* Titusville Iron Works Co.
* Walsh & Weidner Boiler Co.

Tanks, Pressure
* Graver Corp'n
* Hendrick Mfg. Co
Morrison Boiler Co.
* Titusville Iron Works Co.
* Vogt, Henry Machine Co.
* Walsh & Weidner Boiler Co.

Tanks, Steel
Bethlehem Shipbldg.Corp'n (Ltd.)
* Bigelow Co.
* Casey-Hedges Co.
* Cole, R. D. Mfg. Co.
* Graver Corp'n
* Hendrick Mfg. Co.
Morrison Boiler Co.
* Scaife, Wm. B. & Sons Co.
* Titusville Iron Works Co.
* Union Iron Works
* Vogt, Henry Machine Co.
* Walsh & Weidner Boiler Co.

Tanks, Storage
* Cochrane Corp'n
* Cole, R. D. Mfg. Co.
* Combustion Engineering Corp'n
* Graver Corp'n
* Hendrick Mfg. Co.
Morrison Boiler Co.
Nugent, Wm. W. & Co. (Inc.)
* Scaife, Wm. B. & Sons Co.
* Titusville Iron Works Co.
* Vogt, Henry Machine Co.
* Walsh & Weidner Boiler Co.

Tanks, Tower
* Graver Corp'n
* Walsh & Weidner Boiler Co.

Tanks, Welded
* Cole, R. D. Mfg. Co.
* Graver Corp'n
Morrison Boiler Co.
* Scaife, Wm. B. & Sons Co.

Tap Extensions
Allen Mfg. Co.

Tapping Attachments
* Whitney Mfg. Co.

Temperature Regulators
(See Regulators, Temperature)

Testing Laboratories, Cement
* Smidth, F. L. & Co.

Textile Machinery
* Franklin Machine Co.

Thermometers
* American Schaeffer & Budenberg Corp'n
* Ashton Valve Co.
* Bristol Co.
* Sarco Co. (Inc.)
* Tagliabue, C. J. Mfg. Co.
* Taylor Instrument Cos.

Thermometers, Chemical
* Tagliabue, C. J. Mfg. Co.

Thermometers, Distance
* Taylor Instrument Cos.

Thermometers, High Range (Recording)
* Bailey Meter Co.
* Tagliabue, C. J. Mfg. Co.
* Taylor Instrument Cos.

Thermometers, Industrial
* Tagliabue, C. J. Mfg. Co.

Thermostats
* Bristol Co.
* Fulton Co.
* General Electric Co.

Thread Cutting Tools
* Crane Co.
* Jones & Lamson Machine Co.
* Landis Machine Co. (Inc.)

Threading Machines, Pipe
* Landis Machine Co. (Inc.)

Tie Tamping Outfits
* Ingersoll-Rand Co.

Time Recorders
* Bristol Co.

Tinsmiths' Tools and Machines
* Niagara Machine & Tool Works

Tipples, Steel
Link-Belt Co.

Tobacco Machinery
* American Machine & Foundry Co.

Tools, Brass-Working Machine
* Warner & Swasey Co.

Tools, Machinist's Small
* Atlas Ball Co.

Tools, Pneumatic
* Ingersoll-Rand Co.

Tools, Special
DuPont Engineering Co.

Tracks, Industrial Railway
Easton Car & Construction Co.

Tracks, Overhead
Palmer-Bee Co.

Tractors
* Allis-Chalmers Mfg. Co.

Tractors, Industrial (Storage Battery)
* Yale & Towne Mfg. Co.

Tractors, Turntable
* Whiting Corp'n

Trailers, Industrial
* Yale & Towne Mfg. Co.

Tramrail Systems, Overhead
* Brown Hoisting Machinery Co.
Link-Belt Co.
* Whiting Corp'n

Tramways, Bridge
Link-Belt Co.

Tramways, Wire Rope
Clyde Iron Works Sales Co.
Lidgerwood Mfg. Co.
* Roebling's, John A. Sons Co.

Transfer Tables
* Whiting Corp'n

Transformers, Electric
* Allis-Chalmers Mfg. Co.
* General Electric Co.
* Westinghouse Electric & Mfg. Co.

Transmission Machinery
(See Power Transmission Machinery)

Transmissions, Automobile
* Foote Bros. Gear & Machine Co.

Transmissions, Variable Speed
* American Fluid Motors Co.

Traps, Radiator
* American Radiator Co.
* Sarco Co. (Inc.)

Traps, Return
* American Blower Co.
* Crane Co.
* Kieley & Mueller (Inc.)

Traps, Steam
* American Blower Co.
* American Schaeffer & Budenberg Corp'n
* Crane Co.
Elliott Co.
* Jenkins Bros.
Johns-Manville (Inc.)
* Kieley & Mueller (Inc.)
* Reading Steel Casting Co. (Inc.)
(Pratt & Cady Division)
* Sarco Co. (Inc.)
* Schutte & Koerting Co.
Squires, C. E. Co.
* Vogt, Henry Machine Co.

Traps, Vacuum
* American Blower Co.
* American Schaeffer & Budenberg Corp'n
* Crane Co.
* Sarco Co. (Inc.)

Treads
* Irving Iron Works Co.

Treads, Stair (Rubber)
* United States Rubber Co.

Trolleys
* Brown Hoisting Machinery Co
* Whiting Corp'n

Trolleys, Monorail
Palmer-Bee Co.

Trucks, Industrial (Storage Battery)
* Yale & Towne Mfg. Co.

Trucks, Trailer
* Yale & Towne Mfg. Co.

Tubes, Boiler, Seamless Steel
* Casey-Hedges Co

Tubes, Condenser
* Scovill Mfg. Co.
* Wheeler Condenser & Engrg. Co.

Tubes, Pitot
* American Blower Co.
Bacharach Industrial Instrument Co.

Tubing, Rubber
* Goodrich, B. F. Rubber Co
* United States Rubber Co.

Tubing, Rubber (Hard)
* Goodrich, B. F. Rubber Co.

Tumbling Barrels
Farrel Foundry & Machine Co.
* Royersford Fdry. & Mach. Co.
* Whiting Corp'n

Turbines, Hydraulic
* Allis-Chalmers Mfg. Co.
* Cramp, Wm. & Sons Ship & Engine Bldg. Co.
Hoppes Water Wheel Co.
* Leffel, James & Co.
Newport News Shipbuilding & Dry Dock Co.
Smith, S. Morgan Co.
* Worthington Pump & Mchy. Corp'n

Turbines, Steam
* Allis-Chalmers Mfg. Co.
* Coppus Engineering Corp'n
* De Laval Steam Turbine Co
* General Electric Co.
* Kerr Turbine Co.
Ridgway Dynamo & Engine Co.
* Sturtevant, B. F. Co.
* Terry Steam Turbine Co.
* Westinghouse Elec. & Mfg. Co.
* Wheeler Condenser & Engrg. Co.

Turbo-Blowers
* Coppus Engineering Corp'n
* General Electric Co.
* Ingersoll-Rand Co.
* Kerr Turbine Co.
* Sturtevant, B. F. Co.

Turbo-Compressors
* Ingersoll-Rand Co.

Turbo-Generators
* Allis-Chalmers Mfg. Co.
* De Laval Steam Turbine Co.
* General Electric Co.
* Kerr Turbine Co.
Ridgway Dynamo & Engine Co.
* Sturtevant, B. F. Co.
* Terry Steam Turbine Co.
* Westinghouse Electric & Mfg. Co.

Turbo-Pumps
Bethlehem Shipbldg.Corp'n (Ltd.)
* Coppus Engineering Corp'n
* Kerr Turbine Co.
* Terry Steam Turbine Co.
* Wheeler Condenser & Engineering Co.

Turntables
Easton Car & Construction Co.
Link-Belt Co.
Palmer-Bee Co.
* Whiting Corp'n

Turret Machines
(See Lathes, Turret)

Unions
* Crane Co.
* Edward Valve & Mfg. Co.
Lunkenheimer Co.
* Pittsburgh Valve, Fdry. & Const Co.
* Vogt, Henry Machine Co.

*Catalogue data of firms marked * appear in the A.S.M.E. Condensed Catalogues of Mechanical Equipment, 1923-24 Volume*

Reclamation Plant. C. B. & Q. Builds Modern Reclamation Plant. Ry. Age, vol. 76, no. 19, Apr. 12, pp. 919–923, 9 figs. New facility at Eola, Ill., has large scrap dock with huge gantry cranes to facilitate sorting.

REDUCTION GEARS

Shock-Absorbing. Shock-Absorbing and Concentric Speed Transformer. Engineering, vol. 117, no. 3038, Mar. 21, 1924, p. 378, 7 figs. Describes system combining speed reduction obtainable with epicyclic gear, with use of shock-absorbing characteristics of helical springs.

REFRIGERATING MACHINES

Types. Modern Refrigerating Machines, R. G. Reid. Inst. Mar. Engrs., advance paper for meeting Jan. 8, 1924, 11 pp. Factors which have influenced adoption of high-speed compressor; description of some particular machines; summary of tests taken from such machines on test bed and in actual service.

REFRIGERATING PLANTS

Automatic, Electricity in. Electricity in Automatic Refrigeration. W. Deans. Refrig. Eng., vol. 10, no. 9, Mar. 1924, pp. 335–344 and 348–349, 4 figs. Character of load on motor; types, selection, control and protection of motors; description of automatic plant.

Hold-Over Tanks. Heat Transfer in Brine Hold-Over Tanks, Chas. H. Herter. Power, vol. 59, no. 15, Apr. 8, 1924, pp. 563–565. Discusses three types of hold-over tanks; how to calculate size of congealing tank.

REFRIGERATION

Electric. Electro-Mechanical Refrigeration, A. D. Mclay. Nat. Elec. Light Assn. Bul., vol. 11, no. 3, Mar. 1924, pp. 155–158. Temperature observations of cellars and living rooms; summary of refrigerator temperature studies; vapair process; ice-cream cabinets; etc. Abstract of paper read at Great Lakes Division, Nat. Elec. Light Assn.

Oil-Refining Industry. Oil Refinery Refrigeration, C. H. Herter. Refrig. Wld., vol 59, no. 3, Mar. 1924, pp. 13–16. Data on important applications of refrigeration in various industries treating oils, fats and greases.

REGULATORS

Oil-Pressure. The Working of a Generating Set Provided with an Oil-Pressure Regulator (Fonctionnement d'un groupe electrogène pourvu d'un regulateur à pression d'huile, sous la forme la plus générale), M. Barbillion. Revue de l'Industrie Minérale, no. 75, Feb. 1, 1924, pp. 69–76, 2 figs. Discusses working of a tachymetric oil-pressure regulator; design and calculation.

RIVETED JOINTS

Frictional Resistance of. Determination of the Frictional Resistance of Rivet and Bolt Connections (Bestämning av glidmotstandet i nit- och bultförband), W. Weibull. Teknisk Tidskrift, vol. 54, nos. 3 and 7, Jan. 19 and Feb. 16, 1924, pp. 17–21 and 51–54 (Allmänna Avdelningen), 11 figs. Results of measurement of friction between steel plates; calculation of stresses in rivets. Diagrams and tables.

RIVETS

Heat Treating Steel for. Heat Treating Low-Carbon Bars for Rivets, C. B. Langstroth. Iron Age, vol. 113, no. 12, Mar. 20, 1924, pp. 849–850, 3 figs. Advantage derived from heat treating low-carbon steel as shown by some experience with rivets; cold working strains, as cause of broken heads, removed; properties of final product improved.

ROLLING MILLS

Blooming Mill. Builds New Blooming Mill in France. Iron Trade Rev., vol. 47, no. 16, Apr. 17, 1924, pp. 1046–1047, 3 figs. Details of new blooming mill erected in works of Société des Acieries de Longwy, built by Maschinenfabrik Sack, Düsseldorf, Germany; used for breaking down ingots into blooms either for 38-in. two-high reversing shape mill or for other smaller section mills, and in addition serves as slabbing mill for rolling slabs for plate mills.

Gripping of Rolls. The Gripping of Rolls at Variable Rolling Speed (Das Greifen von Walzen bei veränderlicher Walzgeschwindigkeit), W. Tabel and Er. Schneider. Stahl u. Eisen, vol. 44, no. 12, Mar. 20, 1924, pp. 305–309, 9 figs. Theory of gripping process; influence of quality of material; influence of rolling speed on coefficient of friction; critical speed for gripping; tests on smooth and rough rolls; most favorable rolling speed.

ROPE, HOISTING

Wire. Wire Hoisting Ropes for Lifts, G. H. Roberts. Mech. Wld., vol. 75, no. 1940, Mar. 7, 1924, pp. 145–146, 3 figs. Discusses features of primary importance for efficient and economical working of lift ropes; rope life, and conditions of a rope's deterioration.

S

SCREW MACHINES

Five-Spindle. National-Acme Five-spindle Automatic. Machy. (Lond.), vol. 23, no. 597, Mar. 6, 1924, pp. 752–754, 4 figs. Among new features is exclusive use of right-hand tools, telescoping main tool carrier, improved type of spindle carrier, indexing mechanism for spindle carrier, stock feed in either first or fifth spindle, or both, centralized lubrication, etc.

SEAPLANES

Developments and Aims. The World Status of Seaplanes (L'Orientation actuelle de l'Hydraviation mondiale), Boutiron. Aéronautique, vol. 5, no. 55, Dec. 1924, pp. 517–525, 9 figs. Discusses tendencies and aims; evolution of shape and outline; increasing tonnage; metallic construction; improvement of hull and fuselage; future province of marine planes.

SHAFTS

Fastening Drop-Hanger Bearings. The Fastening of Drop-Hanger Bearings (Befestigung von Hängelagern). Praktischer Maschinen-Konstrukteur, vol. 57, no. 3–4, Jan. 22, 1924, pp. 14–16, 9 figs. Abstract from German Industrial Standards Committee (N. D. I.) report on methods of fastening drop-hanger bearings to concrete beams.

Torsional Strength. Torsional Strength of Keyway-cut Shafts, W. R. Needham. Machy. (Lond.), vol. 23, no. 596, Feb. 28, 1924, pp. 705–706, 2 figs. Discusses method of calculating polar moduli; includes table of torsional strength (polar values) of British standard sunk keyway shafts.

SHEET METAL

Stamping. Widening Applications of Metal Stamping, R. I. Miner. Forging—Stamping—Heat Treating, vol. 10, no. 2, Feb. 1924, pp. 75–78, 6 figs. Describes applications of sheet metal stamping, i.e., work of those industries in which sheet metal is forced to take a desired shape through the action of properly designed tools or dies, operated in a mechanical press.

SHELLS

Tapered, Machining. Difficulties in Making Tapered Shells, J. Williams. Am. Mach., vol. 60, no. 16, Apr. 17, 1924, pp. 583–585, 2 figs. Drawing shells with parallel sides; cause of buckling and wrinkling; flowage of molecules; variation in density of metal.

SOOT BLOWERS

Tests. Tests of Diamond Soot Blowers, H. H. Norton. Am. Soc. Nav. Engrs.—Jl., vol. 36, no. 1, Feb. 1924, pp. 42–54, 13 figs. Results of official tests conducted for purpose of determining efficacy of mechanical soot blowers in cleaning water-tube boiler fired with oil fuel, and to ascertain boiler and furnace efficiencies under certain conditions.

SPRINGS

Automobile. Making Springs for Motor Vehicles, F. H. Colvin. Am. Mach., vol. 60, no. 14, Apr. 3, 1924, pp. 509–511, 10 figs. Testing steel and finding best heat treatment for it; methods of forming eyes and bending curves; assembling and testing springs for deflection.

STANDARDIZATION

Simplification and. Simplification and Standardization, R. M. Hudson. Am. Soc. Steel Treating—Trans. vol. 5, no. 3, Mar. 1924, pp. 276–284. Reviews work of Division of Simplified Practice, Dept. of Commerce, together with many associations, societies and individual producers, in bringing about standardization of materials produced, as well as effecting reduction in number of types, grades, brands, finishes and sizes; author brings out that much progress has been made in this work.

STANDARDS

European. European Engineering Standards Issued in 1923. Am. Mach., vol. 60, no. 15, Apr. 10, 1924, p. 538. List of standards issued during 1923 by European Standardizing bodies, which have been received by Am. Eng. Standards Committee, copies of which can be furnished or which may be consulted at offices of Committee.

STEAM

High-Pressure. The High-Pressure Steam Convention of the Institute of German Engineers. Eng. Progress, vol. 5, no. 2, Feb. 1924, pp. 21–22. Brief account of meeting held in Berlin, Jan. 18–19, and of papers read.

What the Boiler Owner Should Know about High-Pressure Steam Was soll der Kesselbesitzer über Hochdruckdampf wissen? Zeit. des Bayerischen Revisions-Vereines, vol. 28, no. 6, Mar. 31, 1924, pp. 41–44, 7 figs. Discusses properties of high-pressure steam up to 100 atmos., and points out that number of auxiliary arrangements are required for its use; difficulties of its generation, complicated design of plants and frequent lack of economic inducements are some of drawbacks counteracting advantages of high-pressure steam.

STEAM ENGINES

Corliss. Erecting a Corliss Engine, G. Edwards. Southern Engr., vol. 40, no. 6, and vol. 41, no. 1, Feb. and Mar. 1924, pp. 49–51 and 54–57, 12 figs. Feb.: Finishing erection and setting valves. Mar.: Final preparations and breaking in the engine.

Power Plants. Slow-Speed Steam Engines for Industrial Purposes, D. S. Capper. Indian & East. Engr., vol. 54, no. 1, Jan. 1924, pp. 34–36. Discusses chief factors which combine to determine best method of power supply, viz., first cost, working costs, suitability to particular work, liability to stoppage owing to breakdowns and strikes, and insurance risk.

Power Plants, Efficient Use in. Steam Engine Utility in Modern Power Plants, A. Murphy. Power House, vol. 17, no. 6, Mar. 20, 1924, pp. 21–24 and 46, 6 figs. Plain slide valve, automatic high speed, Corliss and uniflow types still used efficiently in Canadian field despite hydroelectric development; discussion of different types and how to secure efficiency.

Stops, Standardization of. A. I. & S. E. E. General Specifications for Construction and Installation of Automatic Engine Stops. Iron & Steel Engr., vol. 1, no. 3, Mar. 1924, pp. 135–136. Specifications adopted as standard, Sept. 24, 1923, which shall apply to all automatic engine stops of whatever kind or method. See also article, by W. Greenwood, entitled Standardization of Engine Stops, pp. 136–139.

STEAM PIPE

High-Pressure. Piping Specifications, H. W. Brooks. Power, vol. 59, no. 13, Mar. 25, 1924, pp. 505–506. Gives specifications on high-pressure steam header for Batavia power house of Chicago, Aurora & Elgin Railroad Co., as an example of specifications prepared from purchaser's viewpoint.

STEAM POWER PLANTS

Interconnection of Gas and. Difficulties Encountered in the Operation of Interconnected Gas and Steam Stations (Quelques Difficultés rencontrées dans l'Exploitation des groupements de Centrales à gaz et à vapeur), F. Courtoy. Assn. des Ingenieurs Electriciens Sortis de l'Institut Electrotechnique Montefiore—Bul., vol. 2, series 7, Jan. 1924, pp. 4–14. Deals with technical, commercial and administrative difficulties.

Measuring Instruments. New Apparatus for Steam Power Plants, Measuring and Recording Instruments (Nouveaux Appareils pour Centrales à Vapeur, Instruments de Mesure et d'Enregistrement des Consommations de Vapeur). Industrie Electrique, vol. 33, no. 760, Feb. 25, 1924, pp. 65–72, 13 figs. Description of apparatus constructed and employed by Gen. Elec. Co. in United States and Compagnie Française Thomson-Houston in France.

Prime Movers, Progress in. Progress in Prime Movers, Wm. H. Patchell. Engineer, vol. 137, no. 3561, Mar. 28, 1924, pp. 332–334, 3 figs. Review of developments and progress in size of units and pressure; direction in which progress points at present, with mention of some limitations. (Abstract.) Address before Instn. Mech. Engrs.

Testing, Continuous. Continuous Power-Plant Testing, T. Maynz. Power, vol. 59, nos. 6, 9 and 12, Feb. 5, 26 and Mar. 18, 1924, pp. 205–208, 324–325 and 450–452, 10 figs. Feb. 5: How efficiency of plant can be found each day; examples of necessary log data together with simple process of making calculations. Feb. 29: Checking performance of turbine room. Mar. 18: Making power-plant heat balance.

Thermal Efficiency. Power Plant Simplification, H. D. Fisher. Combustion, vol. 10, no. 4, Apr. 1924, pp. 262–264. Deals with question of how far it is practicable or advisable for an industrial power plant to follow trend of central station to obtain greatest possible thermal efficiency.

STEAM TURBINES

Design and Operation. Modern Large Steam Turbines. Power, vol. 59, no. 14, Apr. 1, 1924, pp. 543–544, 5 figs. Abstract of lecture delivered by L. Helander before Providence Eng. Soc., Jan. 4, 1924, in which he described conditions governing design and operation of large steam turbines.

Water Rates of Geared Turbines, H. E. Brelsford. Mar. Eng. & Shipg. Age, vol. 29, no. 3, Mar. 1924, pp. 171–174, 4 figs. Design and operating factors of impulse, reaction and combined impulse reaction turbines tending to increase economy.

Marine. See MARINE STEAM TURBINES

Nozzle Regulator. An Automatic Nozzle Regulator for Steam Turbines. Eng. Progress, vol. 5, no. 3, Mar. 1924, pp. 54–55, 3 figs. Consists of number of double-heat drop valves, controlled by one common spindle; each single valve controls steam admission to nozzle, or group of nozzles, of first stage; made by Bergmann Elec. Works, Berlin.

Operation. Operating Instructions for Large Turbines. Power, vol. 59, no. 13, Mar. 25, 1924, pp. 490–491. Rules of procedure in starting up and getting turbine under way; taken from instructions of Westinghouse Elec. & Mfg. Co.

Periodic Examination. Periodic Examinations of Steam Turbines. Power, vol. 59, no. 15, Apr. 8, 1924, pp. 562–563. Instructions of Westinghouse Elec. & Mfg. Co. on details which should be critically observed in periodic examinations.

STEEL

Abrasion, Resistance to. Brinell's Researches on the Resistance of Iron, Steel and Some Other Materials to Wear, H. A. Holz. Testing, vol. 1, no. 2, Feb. 1924, pp. 104–146, 21 figs. Review of researches and test data, largely based upon translation of Brinell's original paper in Swedish.

Alloy. See ALLOY STEELS.

Basic and Acid, Comparison. Comparative Investigation of Basic and Acid Steels. Foundry Trade Jl., vol. 29, no. 394, Mar. 6, 1924, pp. 200–201. Also Iron & Coal Trades Rev., vol. 108, no. 2922, Feb. 29, 1924, p. 352. Abstract of paper by F. Schmitz published in recent issue of Stahl u. Eisen, giving details of tests made by author, using new method of comparing basic and acid steels.

Composition. Common Elements in Plain Carbon Steel, V. E. Hillman and F. L. Coonan. Forging—Stamping—Heat Treating, vol. 10, no. 2, Feb. 1924, pp. 66–68. A non-technical discussion of properties imparted to steel by common elements entering into its composition; carbon plays most important role.

Elastic Limit. Determination of the Elastic Limit of Steels (Détermination industrielle de la limite élastique des aciers), J. Durand. Génie Civil, vol. 84, no. 9, Mar. 1, 1924, pp. 205–208, 3 figs. Discusses three methods of determining elastic limit of steel for industrial uses; comparison of results.

High-Sulphur. Effect of Zirconium on Hot Rolling Properties of High-sulfur Steels and the Occurrence of Zirconium Sulfide, A. L. Field. Am. Inst. Min. & Met. Engrs.—Trans., no. 1306-S, Feb. 1924, 17 pp., 10 figs. Describes hot-rolling properties of

Manufactured by Advertisers — CLASSIFIED LIST OF MECHANICAL EQUIPMENT — Alphabetical List on page 156

Unions, Pressed Steel
Rockwood Sprinkler Co.

Unloaders, Air Compressor
* Ingersoll-Rand Co.
* Worthington Pump & Machinery Corp'n

Unloaders, Ballast
Lidgerwood Mfg. Co.

Unloaders, Car
* Gifford-Wood Co.
Link-Belt Co.

Vacuum Breakers
* Foster Engineering Co.

Vacuum Dryers, Pans, Pumps, Traps, etc.
(See Pans, Pumps, Traps, etc., Vacuum)

Valve Discs
* Edward Valve & Mfg. Co.
Garlock Packing Co.
* Goodrich, B. F. Rubber Co.
* Jenkins Bros.
* Reading Steel Casting Co. (Inc.) (Pratt & Cady Division)
* United States Rubber Co.

Valves, Air, Automatic
* Fulton Co.
* Jenkins Bros.
* Simplex Valve & Meter Co.
* Smith, H. B. Co.

Valves, Air (Operating)
* Foster Engineering Co.

Valves, Air, Relief
* American Schaeffer & Budenberg Corp'n
* Foster Engineering Co.
* Fulton Co.
Lunkenheimer Co.
* Nordberg Mfg.Co.
* Schutte & Koerting Co.

Valves, Altitude
* Foster Engineering Co.
* Simplex Valve & Meter Co.

Valves, Ammonia
* American Schaeffer & Budenberg Corp'n
* Crane Co.
* De La Vergne Machine Co.
* Foster Engineering Co.
* Jenkins Bros.
Lunkenheimer Co.
* Reading Steel Casting Co. (Inc.) (Pratt & Cady Division)
* Vilter Mfg. Co.
* Vogt, Henry Machine Co.

Valves, Back Pressure
* Cochrane Corp'n
* Crane Co.
* Foster Engineering Co.
* Jenkins Bros.
* Kieley & Mueller (Inc.)
* Pittsburgh Valve, Fdry. & Const. Co.
* Reading Steel Casting Co. (Inc.) (Pratt & Cady Division)
* Schutte & Koerting Co.

Valves, Balanced
* Crane Co.
* Foster Engineering Co.
* Kieley & Mueller (Inc.)
Lunkenheimer Co.
* Mason Regulator Co.
* Nordberg Mfg. Co.
* Schutte & Koerting Co.

Valves, Blow-off
* Ashton Valve Co.
* Bowser, S. F. & Co. (Inc.)
* Crane Co.
* Crosby Steam Gage & Valve Co.
Elliott Co.
* Jenkins Bros.
Lunkenheimer Co.
* Pittsburgh Valve, Fdry. & Const. Co.
* Reading Steel Casting Co. (Inc.) (Pratt & Cady Division)

Valves, Butterfly
* Chapman Valve Mfg. Co.
* Crane Co.
Lunkenheimer Co.
* Pittsburgh Valve, Fdry. & Const. Co.
* Schutte & Koerting Co.

Valves, Check
* American Schaeffer & Budenberg Corp'n
* Bowser, S. F. & Co. (Inc.)
* Chapman Valve Mfg. Co.
* Crane Co.
* Crosby Steam Gage & Valve Co.
* Jenkins Bros.
Kennedy Valve Mfg. Co.
Lunkenheimer Co.
* Nordberg Mfg. Co.
* Pittsburgh Valve, Fdry. & Const. Co.
* Reading Steel Casting Co. (Inc.) (Pratt & Cady Division)
* Schutte & Koerting Co.
* Vogt, Henry Machine Co.
* Worthington Pump & Machinery Corp'n

Valves, Chronometer
* Foster Engineering Co

Valves, Combined Back Pressure Relief
* Foster Engineering Co.

Valves, Diaphragm
* Foster Engineering Co.

Valves, Electrically Operated
* Chapman Valve Mfg. Co.
* Dean, Payne (Ltd.)
* General Electric Co.
Kennedy Valve Mfg. Co.
Lunkenheimer Co.
* Pittsburgh Valve, Fdry. & Const. Co.
* Reading Steel Casting Co. (Inc.) (Pratt & Cady Division)
* Schutte & Koerting Co.

Valves, Exhaust Relief
* Cochrane Corp'n
* Crane Co.
* Foster Engineering Co.
* Jenkins Bros.
* Kieley & Mueller (Inc.)
* Pittsburgh Valve, Fdry. & Const. Co.
* Schutte & Koerting Co.
* Wheeler, C. H. Mfg. Co.
* Wheeler Cond. & Engrg. Co.

Valves, Float
* American Schaeffer & Budenberg Corp'n
* Crane Co.
* Dean, Payne (Ltd.)
* Foster Engineering Co.
* Kieley & Mueller (Inc)
* Mason Regulator Co.
* Pittsburgh Valve, Fdry. & Const. Co.
* Schutte & Koerting Co.
* Simplex Valve & Meter Co.

Valves, Foot
* Crane Co.
* Pittsburgh Valve, Fdry. & Const. Co.
* Worthington Pump & Machinery Corp'n

Valves, Fuel Oil Shut-off
* Tagliabue, C. J. Mfg. Co.

Valves, Gate
* Chapman Valve Mfg. Co.
* Crane Co.
* Jenkins Bros.
Kennedy Valve Mfg. Co.
Lunkenheimer Co.
* Pittsburgh Valve, Fdry. & Const. Co.
* Reading Steel Casting Co. (Inc.) (Pratt & Cady Division)
* Schutte & Koerting Co.

Valves, Globe, Angle and Cross
* Bowser, S. F. & Co. (Inc.)
* Crane Co.
* Crosby Steam Gage & Valve Co.
* Jenkins Bros.
Kennedy Valve Mfg. Co.
Lunkenheimer Co.
* Pittsburgh Valve, Fdry. & Const. Co.
* Reading Steel Casting Co. (Inc.) (Pratt & Cady Division)
* Vogt, Henry Machine Co.

Valves, Hose
* Chapman Valve Mfg. Co.
* Crane Co.
* Jenkins Bros.
Kennedy Valve Mfg. Co.
Lunkenheimer Co.
* Reading Steel Casting Co. (Inc.) (Pratt & Cady Division)

Valves, Hydraulic
* Chapman Valve Mfg. Co.
* Crane Co.
* Crosby Steam Gage & Valve Co
Lunkenheimer Co.
* Pittsburgh Valve, Fdry. & Const. Co.
* Reading Steel Casting Co. (Inc.) (Pratt & Cady Division)
* Schutte & Koerting Co.
* Vogt, Henry Machine Co.

Valves, Hydraulic Operating
* Chapman Valve Mfg. Co.
Kennedy Valve Mfg. Co.
Lunkenheimer Co.
* Pittsburgh Valve, Fdry. & Const Co.
* Reading Steel Casting Co. (Inc.) (Pratt & Cady Division)
* Schutte & Koerting Co.

Valves, Non-Return
* Crane Co.
* Crosby Steam Gage & Valve Co.
* Foster Engineering Co.
* Jenkins Bros.
* Kieley & Mueller (Inc.)
Lunkenheimer Co.
* Pittsburgh Valve, Fdry. & Const. Co.
* Reading Steel Casting Co. (Inc.) (Pratt & Cady Division)
* Schutte & Koerting Co.

Valves, Plug
* Chapman Valve Mfg. Co.
* Reading Steel Casting Co. (Inc.) (Pratt & Cady Division)

Valves, Pop Safety
* American Schaeffer & Budenberg Corp'n
* Ashton Valve Co.
* Crane Co.
* Crosby Steam Gage & Valve Co.
Lunkenheimer Co.

Valves, Pump
* Bowser, S. F. & Co. (Inc.)
Garlock Packing Co.
* Goulds Mfg. Co.
* Jenkins Bros.
Johns-Manville (Inc.)
* Nordberg Mfg. Co.
* United States Rubber Co.

Valves, Radiator
* American Radiator Co.
* Crane Co.
* Dean, Payne (Ltd.)
* Fulton Co.
* Jenkins Bros.
Kennedy Valve Mfg. Co.
Lunkenheimer Co.
* Reading Steel Casting Co. (Inc.) (Pratt & Cady Division)

Valves, Radiator, Packless
* American Radiator Co.
* Fulton Co.

Valves, Reducing
Elliott Co.
* Foster Engineering Co.
* Fulton Co.
* Kieley & Mueller (Inc.)
* Mason Regulator Co.
Squires, C. E. Co.
* Tagliabue, C. J. Mfg. Co.

Valves, Regulating
* Crane Co.
* Dean, Payne (Ltd.)
* Foster Engineering Co.
* Fulton Co.
* Kieley & Mueller (Inc.)
Lunkenheimer Co.
* Simplex Valve & Meter Co.

Valves, Relief (Water)
* American Schaeffer & Budenberg Corp'n
* Ashton Valve Co.
* Crane Co.
* Crosby Steam Gage & Valve Co.
* Foster Engineering Co.
Lunkenheimer Co.

Valves, Safety
* American Schaeffer & Budenberg Corp'n
* Crane Co.
* Crosby Steam Gage & Valve Co.
* Jenkins Bros.
Lunkenheimer Co.

Valves, Stop and Check
(See Valves, Non-Return)

Valves, Superheated Steam (Steel)
* Bowser, S. F. & Co. (Inc.)
* Chapman Valve Mfg. Co.
* Crane Co.
* Jenkins Bros.
Kennedy Valve Mfg. Co.
Lunkenheimer Co.
* Nordberg Mfg. Co.
* Pittsburgh Valve, Fdry.&Con. Co.
* Reading Steel Casting Co. (Inc.) (Reading Valve & Fittings Div.)
* Schutte & Koerting Co.
* Vogt, Henry Machine Co.

Valves, Thermostatically Operated
* Dean, Payne (Ltd.)
* Fulton Co.

Valves, Throttle
* Crane Co.
* Jenkins Bros.
Lunkenheimer Co.
* Nordberg Mfg. Co.
* Pittsburgh Valve, Fdry. & Const. Co.
* Reading Steel Casting Co. (Inc.) (Pratt & Cady Division)
* Schutte & Koerting Co.

Valves, Vacuum Heating
* Foster Engineering Co.

Ventilating Systems
* American Blower Co.
* Clarage Fan Co.

Voltmeters
* Bristol Co.
* General Electric Co.
* Westinghouse Electric & Mfg. Co

Vulcanizers
* Bigelow Co.
Farrel Foundry & Machine Co.

Washers, Rubber
Garlock Packing Co.
* Goodrich, B. F. Rubber Co.
* United States Rubber Co.

Water Columns
* American Schaeffer & Budenberg Corp'n
* Ashton Valve Co.
* Kieley & Mueller (Inc.)
Lunkenheimer Co.

Water Purifying Plants
* Graver Corp'n
International Filter Co.
* Scaife, Wm. B. & Sons Co.

Water Softeners
* Cochrane Corp'n
* Graver Corp'n
International Filter Co.
* Permutit Co.
* Scaife, Wm. B. & Sons Co
* Wayne Tank & Pump Co.

Water Wheels
(See Turbines, Hydraulic)

Waterbacks, Furnace
* Combustion Engineering Corp'n

Waterproofing Materials
* Celite Products Co.
Johns-Manville (Inc.)

Wattmeters
* Bristol Co.
* General Electric Co.
* Westinghouse Electric & Mfg. Co

Weighing Machinery, Automatic
* American Machine & Foundry Co.

Welding and Cutting Work
* Linde Air Products Co.

Welding Equipment, Electric
* General Electric Co.

Wheels, Polishing Paper
Rockwood Mfg. Co.

Whistles, Steam
* American Schaeffer & Budenberg Corp'n
* Ashton Valve Co.
* Brown, A. & F. Co.
* Crane Co.
* Crosby Steam Gage & Valve Co.
Lunkenheimer Co.

Winches
* Brown Hoisting Machinery Co.
Lidgerwood Mfg. Co.

Wire, All Metals
Driver-Harris Co.

Wire, Brass and Copper
* Roebling's, John A. Sons Co.

Wire, Flat
* Roebling's, John A. Sons Co.

Wire, Iron and Steel
* Roebling's, John A. Sons Co.

Wire and Cables, Electrical
* General Electric Co.
* Roebling's, John A. Sons Co.
* United States Rubber Co.

Wire Mechanism (Bowden Wire)
* Gwilliam Co.

Wire Rope
(See Rope, Wire)

Wire Rope Fastenings
Lidgerwood Mfg. Co.
* Roebling's, John A. Sons Co.

Wire Rope Slings
* Roebling's, John A. Sons Co

Wiring Devices
* General Electric Co.

Worm Gear Drives
* Cleveland Worm & Gear Co
* Foote Bros. Gear & Mach. Co
* James, D. O. Mfg. Co.
* Jones, W. A. Fdry. & Mach. Co.
Link-Belt Co.

Wrapping Machinery
* American Machine & Foundry Co.

Wrenches
* Roebling's, John A. Sons Co.

*Catalogue data of firms marked * appear in the A.S.M.E. Condensed Catalogues of Mechanical Equipment, 1923-24 Volume*

series of high-sulphur steels; shows how zirconium reacts with sulphur content of molten steel.

Manganese. See MANGANESE STEEL.

Stainless. Metallurgical Data on Stainless Steels, H. H. Abram. Chem. & Met. Eng., vol. 30, no. 11, Mar. 17, 1924, pp. 430–431. Results of careful investigation of properties: tells how properties most desired in any particular case may be obtained by means of heat treatment.

Tool. See TOOL STEEL.

Welding Heat, Behavior at. The Behavior of Low-Carbon Sheet Iron at Welding Heat (Das Verhalten von Flusseisenblechen in der Schweisshitze), H. Schottky. Kruppsche Monatshefte, vol. 5, Jan. 1924, pp. 1–6, 11 figs. Through tests with series of silicon-free plates, it is shown that bending test at maximum temperatures—1350 to 1450 deg.—gives good idea of resistivity of low-carbon steel at welding heat.

Work Hardening of. Influence of Temperature on the Work-Hardening of Metals, E. G. Herbert. Engineer, vol. 137, no. 3562, Apr. 4, 1924, pp. 356–357, 6 figs. Tests for measuring work-hardening properties of mild steel at succession of temperatures such as might be expected to be generated by action of cutting tool.

STEEL CASTINGS

Manufacture. Liquid Steel for Castings, T. E. Hull. Foundry Trade Jl., vol. 29, no. 396, Mar. 20, 1924, pp. 238–240. Deals with subject of liquid steel as required for sand molds in production of steel castings. Control of slag; slag inclusions; influence of dissolved or occluded gases; shrinkage; liquidity and fluidity of steel; chemical composition.

STEEL, HEAT TREATMENT OF

Carburization. Heat-Treatment of Steel with Special Reference to Production, J. W. Urquhart. Machy. (Lond.), vol. 23, no. 596, Feb. 28, 1924, pp. 707–711, 4 figs. Carbon concentration and core condition; deep penetration; wasteful carburization; distortion factor; heating for quenching.

Quenching. Effect of Repeated Quenching on Hardness, A. Katto. Forging—Stamping—Heat Treating, vol. 10, no. 3, Mar. 1924, pp. 126–129, 6 figs. Points out that many steels that are not sufficiently hardened after first quenching frequently develop cracks if quenching is repeated, due to excessive hardening.

The Quenching Bath. Machy. (Lond.), vol. 23, no. 597, Mar. 6, 1924, pp. 741–742, 1 fig. Facts concerning rate of cooling; effect of specific heat of bath.

STEEL WORKS

Bethlehem, Pa. Brief Description of the Bethlehem Steel Co.'s Plant. Min. & Metallurgy, vol. 5, no. 208, Apr. 1924, pp. 168–171, 4 figs. Divisions of plant; railroad facilities; power plants; blast-furnace department; open-hearth and bessemer departments; rolling mills, foundries and forge departments; machine shops, etc.; products of plant.

Cost and Practice Chart. The A. I. and S. E. E. Iron and Steel Cost and Practice Chart. Iron & Steel Engr., vol. 1, no. 3, Mar. 1924, supp. loose folder, containing cost data on coke ovens, blast furnaces, open hearth, blooming mill and electric power, compiled by B. R. Shover.

Electric Drive. Inland Steel Electrically Operated, F. J. Crolius. Blast Furnace & Steel Plant, vol. 12, nos. 2 and 3, Feb. and Mar. 1924, pp. 90–93 and 142–147, 8 figs. Feb.: Describes by-product coke plant and replacement of steam-driven units by electrical equipment at Indian Harbor plant of Inland Steel Co. Mar.: Electrical equipment in various departments of the two plants.

Sweden. Bofors.—The Famous Swedish Steel Works. Forging—Stamping—Heat Treating, vol. 10, no. 3, Mar. 1924, pp. 119–121, 7 figs. Details of Bofors work, founded in 1646, for making fine steel and guns; includes two blast furnaces, steel works with 3 open-hearth furnaces, rolling mills, steel foundry, pig-iron and brass foundry, laboratory and testing department, pressing and forging departments, machine shops, etc.

STOKERS

Electric Drives for. What Type of Stoker Drive Should Be Used? Power Plant Eng., vol. 28, no. 7, Apr. 1, 1924, pp. 374–377, 4 figs. Relative advantages of engine, turbine, a.c. and d.c. motor drives.

STREET RAILWAYS

Cars, German. New German Cars Have Unique Features. Elec. Ry. Jl., vol. 63, no. 15, Apr. 12, 1924, pp. 574–575, 3 figs. Details of new cars added to rolling stock of Krefeld Street Ry. system, Germany; thin castings for truck side frames; special leaf springs; all bearings roller type; air for motors taken in at roof; doors on ball bearings. From Verkehrstechnik, Sept. 7, 1923.

Track Maintenance and Reconstruction. Keeping Track Machinery "on the Job." Elec. Ry. Jl., vol. 63, no. 12, Mar. 22, 1924, pp. 463–469, 11 figs. How track maintenance and reconstruction are expedited by use of large variety of machine equipment, by Milwaukee Elec. Ry. & Light Co.

SUBWAYS

Repair-Shop Methods. Keeping Subway Trains on Schedule, F. H. Colvin. Am. Mach., vol. 66, nos. 14 and 16, Apr. 3 and 17, 1924, pp. 491–493 and 587–589, 16 figs. Methods of handling motive power in exacting service. Apr. 3: Wheels, tires and journal bearings. Apr. 17: How motor pinions are removed and armatures taken out of motors; method of testing pinions for cracks.

SUPERHEATED STEAM

Application. Superheated Steam, H. F. Ely and L. Weil. Indus. Mgt. (N. Y.), vol. 67, no. 4, Apr. 1924, pp. 212–215, 6 figs. Modern practice in application of superheat.

SUPERPOWER

United States. The Significance and Status of Super Power Development in the United States, E. B. Whitman. Mfrs. Rec., vol. 85, no. 13, Mar. 27, 1924, pp. 79–81, 1 fig. Resume of what it is hoped will be eventually accomplished for the entire country.

T

TAPS

Standard Tolerances for. Standardizing Tolerances for Taps—Discussion, Chas. C. Winter. Am. Mach., vol. 60, no. 16, Apr. 17, 1924, pp. 593–594. Discussion of article by W. Daley published in same journal, vol. 60, p. 217.

TEMPERATURE CONTROL

Automatic Regulators. "Samson" Automatic Temperature Regulators. Power Engr., vol. 19, no. 216, Mar. 1924, pp. 105–106, 3 figs. Device for maintaining constant temperature of atmosphere or of liquids heated by air, hot water or steam.

TERMINALS, LOCOMOTIVE

Turntables. Unusually Quick Installation of Longer Turntable, H. S. Clarke. Ry. Rev. vol. 74, no. 14, Apr. 5, 1924, pp. 644–649, 9 figs. Delaware & Hudson Co. replaces balanced turntable with longer twin span table in remarkable short time.

TERMINALS, RAILWAY

Freight. Pennsylvania Completes New Freight Station. Ry. Age, vol. 76, no. 18, Apr. 5, 1924, pp. 875–878, 10 figs. Capacious two-level structure latest feature of Pennsylvania's entrance into Detroit; building has concrete roof and expansion joints; 25-ton gantry crane for team tracks.

Freight Haulage in. Successful Tractor and Trailor Haulage, J. F. Murphy. Port & Terminal, vol. 4, no. 1, Feb. 1924, pp. 16–19, 6 figs. Intra-city automotive hauling and intra-terminal haulage; off-track versus on-track railway depots; tractor and semi-trailer movement control.

St. Paul, Minn. St. Paul Union Depot Completes Third Section, G. W. Wilsey. Ry. Age, vol. 76, no. 17, Mar. 29, 1924, pp. 827–830, 6 figs. Extension of waiting room and six more tracks placed in service; details of small engine terminal, coaling station, engine house and machine shop.

TESTING MACHINES

Tensile. Inauguration of 100-Ton Tensile Testing Machine at Birmingham. Gas Jl., vol. 165, no. 3173, Mar. 5, 1924, pp. 563–565, 2 figs. Machine is of vertical single-lever type, operated by four straining screws driven through suitable reduction gearing by 15-hp. 440-volt motor; installed at Research Laboratories of Birmingham Gas Dept.

TEXTILE MILLS

Oil-Engine Drive. The Heavy Oil Engine for Factory Drive. Indus. Australian & Min. Standard, vol. 71, no. 1834, Jan. 31, 1924, pp. 167–168, 5 figs. Results obtained at Coney Lane textile mill, Keighley.

TIRES, RUBBER

Low-Pressure. Low-Pressure Tyres. Autocar, vol. 52, no. 1484, Mar. 28, 1924, pp. 549–551, 7 figs. Review of present position; arguments for and against the new tires; changes necessary in converting from ordinary tires.

Motor-Truck. The Choice of Tyres for Coaches. Motor Transport (Lond.), vol. 38, no. 993, Mar. 10, 1924, pp. 291–292, 5 figs. Discussion on relative merits of pneumatic, semi-pneumatic and solid equipment from economic point of view.

TOOL STEEL

Hardness and Cutting Trials. Hardness and Cutting Trials of a Tool Steel, Dempster Smith and Israel Hey. Engineer, vol. 137, no. 3562, Apr. 4, 1924, pp. 366–368, 8 figs. Hardness observations on tool steel; cutting tests in Herbert tool-steel testing machine; cutting trials with tools held in turret of ordinary lathe; variation in vertical force with speed of cutting; durability trials with hardened tools subjected to different subsequent heat treatments. Paper read before Manchester Assn. Engrs.

TOOLS

Design. Tool Engineering, A. A. Dowd and F. W. Curtis. Am. Mach., vol. 60, no. 13, Mar. 27, 1924, pp. 463–465, 4 figs. Points of importance in making drawings and keeping records of them.

TRACTORS

Cross-Country. Traction Across Rough and Roadless Country, L. A. Legros. Engineering, vol. 117, nos. 3035, 3036 and 3037, Feb. 29, Mar. 7 and 14, 1924, pp. 282–286, 316–319 and 347–350, 63 figs. General consideration of problem; examination of qualities that cross-country tractor possess, and general features of such tractors. Paper read before Brit. Section of Société des Ingenieurs Civils de France.

TRANSPORTATION

Street Car-Bus System. How Saginaw has Coordinated Railway and Bus. Elec. Ry. Jl., vol. 63, no. 14, Apr. 5, 1924, pp. 531–534, 4 figs. Unified system of transportation result of people's referendum; 25 modern buses operate on three routes specified in 15-yr. franchise; control of system in hands of public; railway equipment rebuilt and painted.

TURBO-GENERATORS

Niagara Falls. World's Largest Hydro Unit. M. C. Olson and D. B. Plenge. Elec. Wld., vol. 83, no. 4, Jan. 26, 1924, pp. 174–177, 6 figs. Describes Niagara Falls Power Co.'s new turbo-generator, rated at 65,000 kva.; weight is 1,500,000 lb.; driven by a 70,000-hp. hydraulic turbine under an effective head of 213.5 ft.

V

VIBRATIONS

Machinery. Vibration and Noise, R. B. Grey. Electrician, vol. 92, no. 2392, Mar. 21, 1924, pp. 354–355, 4 figs. Their isolation as affecting erection of machinery; methods by which it has been successfully accomplished during last few years.

VOCATIONAL TRAINING

Vocational Guidance and Selection. The Use of Vocational Tests in the Selection of a Vocation, C. S. Myers. Roy. Soc. Arts—Jl., vol. 72, no. 3722, Mar. 21, 1924, pp. 291–298 and (discussion) 298–302. Vocational selection is defined as the process of choosing, by systematic examination of worker's mental and physical condition, those workers best fitted for vacancies in any one occupation. Work being done on the subject; methods of vocational testing.

W

WASTE HEAT

Industrial Furnaces, Recovery from. Production and Recovery of Waste Heat from Industrial Furnaces (Entstehung und Gewinnung der Abhitze von Industrieofen), P. Beck. Gesundheits-Ingenieur, vol. 47, no. 12, Mar. 22, 1924, pp. 90–95. Based on practical experiences important aspects of waste-heat installations are discussed; results of tests on high- and low-pressure waste-heat boilers; suggestions for further developments in design of such boilers.

Utilization. Waste-Heat Utilization Plant in Municipal Rudolf-Virchow Hospital in Berlin (Abdamfverwertungsanlage im städt. Rudolf-Virchow-Krankenhause zu Berlin), Ploppa. Archiv für Wärmewirtschaft, vol. 5, no. 3, Mar. 1924, pp. 49–51, 3 figs. Increase in economy and efficiency obtained by heating water-heating apparatus with waste steam.

WELDING

Electric. See ELECTRIC WELDING, ARC; ELECTRIC WELDING, RESISTANCE.

Iron Castings. See IRON CASTINGS, WELDING.

Oxy-Acetylene. See OXY-ACETYLENE WELDING.

Pipe Lines. Pipe Line Welding, N. E. Wagner. Acetylene Jl., vol. 25, no. 6, Dec. 1923, pp. 276–280 and 284–285, 8 figs. Review of progress made in this field during 1923.

WELDS

Welded Joints, Efficiency of. How Efficient Are Welded Joints? E. E. Michaels. Contract Rec. & Eng. Rev., vol. 38, no. 14, Apr. 2, 1924, pp. 327–329, 4 figs. Tests conducted by Chicago Bridge & Iron Works to determine efficiencies of various types of joints; results obtained provide excellent design data.

WELFARE WORK

National Cash Register Co. Plant. Human Factors at Cash Register Plant. Iron Age, vol. 113, no. 12, Mar. 20, 1924, pp. 843–847, 10 figs. Evolution of welfare work of Nat. Cash Register Co. at Dayton, Ohio; division of profits with resultant low labor turnover; apprenticeship in coöperation with engineering schools.

WIND MOTORS

Electricity Supply by. Modern Installations for the Generation of Electricity by Wind Power (Neuere Anlagen zur Erzeugung von Elektrizität durch Windkraft), L. Riefstahl. Praktischer Maschinen-Konstrukteur, vol. 57, no. 6, Feb. 15, 1924, pp. 49–51, 4 figs. Discusses useful field of wind-electric plants and describes AEG (German Gen. Elec.) system and other plants carried according to this system; economic aspects.

WOOD PRESERVATION

Mine Timber. Wood Preservation and Reforestation Advances Reviewed by American Mine Institute, Coal Age, vol. 25, no. 14, Apr. 3, 1924, pp. 491–492, 4 figs. Discusses three methods whereby present situation may be at least partially relieved, namely, (1) use of less timber in mining; (2) preservation through chemical treatment of timber used; and (3) employment of various substitutes for timber. Based on round-table discussion at Am. Inst. Min. & Met. Engrs.

Pressure Process, Treatment by. Specification for the Preservative Treatment of Timbers by Pressure Processes. Wood Preserving News, vol. 2, no. 3, Mar. 1924, pp. 40–43, 2 figs. Approved at 20th Annual Mtg. of Am. Wood-Preservers' Assn., 1924.

WOODWORKING MACHINES

Wood-Planing Machines. High-Speed Wood-Planing Machine. Engineering, vol. 117, no. 3040, Apr. 4, 1924, pp. 445–446, 6 figs. partly on p. 436. Planing machine for production of flooring boards and other repetitive planing work, capable of completely planing timber up to 12 in. by 5 in. in section at rate of 300 ft. per min.

Alphabetical List of Advertisers

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*Catalogue data of firms marked * appear in the A.S.M.E Condensed Catalogues of Mechanical Equipment, 1923-24 Volume*

THE ENGINEERING INDEX

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THE ENGINEERING INDEX presents each month, in conveniently classified form, items descriptive of the articles appearing in the current issues of the world's engineering and scientific press of particular interest to mechanical engineers. At the end of the year the monthly installments are combined along with items dealing with civil, electrical, mining and other branches of engineering, and published in book form, this annual volume having regularly appeared since 1906. In the preparation of the Index by the engineering staff of The American Society of Mechanical Engineers some 1200 technical publications received by the Engineering Societies Library (New York) are regularly reviewed, thus bringing the great resources of that library to the entire engineering profession.

Photoprint copies (white printing on a black background) of any of the articles listed in the Index may be obtained at a price of 25 cents a page. When ordering photoprints identify the article by quoting from the Index item: (1) Title of article; (2) Name of periodical in which it appeared; (3) Volume, number, and date of publication of periodical; (4) Page numbers. A remittance of 25 cents a page should accompany the order. Orders should be sent to the Engineering Societies Library, 29 West 39th Street, New York.

(See also page 442 of this issue for supplementary items.)

ABRASIVE WHEELS

Rubber-Bond. The Manufacture of Rubber-bond Grinding Wheels, E. Sheldon. Am. Mach., vol. 60, no. 21, May 22, 1924, pp. 777–780, 17 figs. Vulcanizing the wheels; static test to determine breaking strength; methods of dressing wheels; running test; wheels for various purposes.

AIR COMPRESSORS

Cylinder Lubrication. Air Compressor Cylinder Lubrication. Lubrication, vol. 10, no. 3, Mar. 1924, pp. 25–36, 14 figs. Temperatures involved; basic construction features of several types of air compressors; compressor-oil requirements; methods of air-cylinder lubrication; air-compressor explosions.

Portable Sets. Portable Air Compressor Sets. Engineering, vol. 117, no. 3039, Mar. 28, 1924, pp. 398–400, 8 figs. Modifications introduced by Globe Pneumatic Eng. Co., Lond., including new type of lightweight set on much improved frame and carriage, specially designed to conform to regulations regarding trailer vehicles.

AIR CONDITIONING

Air Cleaners. Determining the Efficiency of Air Cleaners, A. M. Goodloe. Am. Soc. Heat. & Vent. Engrs.—Jl., vol. 30, no. 2, Feb. 1924, pp. 115–119, 5 figs. Describes apparatus and method for determining by weight efficiency of average commercial cleaner, devised primarily for purpose of making a forced efficiency test of air cleaners in a laboratory or shop.

AIR PUMPS

Water vs. Steam-Jet. Water and Steam-Jet Air Pumps for Surface Condensers Especially on Board Ships (Wasser- und Dampfstrahl-Luftpumpen für Oberflächenkondensatoren insbesondere auf Schiffen). Zeit. des Vereines deutscher Ingenieure, vol. 68, no. 12, Mar. 22, 1924, pp. 288–292. Contributions from representatives of steam-jet pumps with and without intermediate coolers, challenging statements on superiority of water-jet pump contained in articles by Blaum and Richter in same journal (vol. 67, nos. 39–40 and 45, pp. 956 and 1042, 1923); replies from Blaum and Richter are included.

AIRCRAFT CONSTRUCTION MATERIALS

Metallic. Some Materials in Aircraft Construction. Roy. Aeronautical Soc.—Jl., vol. 28, no. 160, Apr. 1924, pp. 226–248 and (discussion) 248–259, 6 figs. First article, by J. D. North, discusses materials which should be used to give lightest structure. Second article, by L. Aitchison, deals with properties of metallic aircraft materials.

Steel and Duralumin Tubing. Torsional Strength of Nickel Steel and Duralumin Tubing as Affected by the Ratio of Diameter to Gage Thickness, N. S. Otey. Nat. Advisory Committee for Aeronautics—Tech. Notes, no. 189, Apr. 1924, 8 pp., 15 figs. on supp. plates. Tests to determine extent of variations of torsional modulus of rupture with ratio of diameter to gage thickness.

AIRPLANE ENGINES

Air-Cooled. Radial Air-Cooled Aero Engines, A. H. R. Fedden. Roy. Aeronautical Soc.—Jl., vol. 28, no. 160, Apr. 1924, pp. 260–267. Outlines advantages and disadvantages of static air-cooled radial engine, and attempts to analyze problems peculiar to it.

Evolution. The Evolution of Aircraft Engines (L'évolution des moteurs d'aviation), Martinot-Lagarde. Technique Moderne, vol. 16, no. 7, Apr. 1, 1924, pp. 195–207, 19 figs. General characteristics; principal types—water-cooled and air-cooled engines; rôle of light metals; factors influencing efficiency of engines; compression; engines for high altitudes and high speeds; means of reducing power loss with altitude; setting and installation of engines; technical details of cylinder construction; new cycles for automobiles and aviation.

French Developments. The Great Efforts of French Industry towards Development of New Engines (Le grand effort de l'industrie française vers les moteurs nouveaux). Aérophile, vol. 32, nos. 3–4 and 5–6, Feb. 1–15 and Mar. 1–15, 1924, pp. 61–64 and 102–105, 10 figs. Review of progress made in design of airplane engines and examination of different types, including nearly all of well-known French makes.

Radiators. Modern Radiators for Aeronautical Engines. Aviation, vol. 16, no. 20, May 19, 1924, pp. 536–537, 4 figs. New Lamblin radiator consists of manifold fixed to front of wing spar or of strut of landing gear and it is divided into two parts by partition; advantages of 1924 over 1922 model.

AIRPLANE PROPELLERS

Design and Tests. The Analysis of Free Flight Propeller Tests and Its Application to Design, M. M. Munk. Nat. Advisory Committee for Aeronautics—Report, no. 183, 1924, 12 pp., 20 figs. New and useful method suitable for design of propellers and for interpretation of tests with propellers.

AIRPLANES

Annular Type. The "Annular" Type of Aeroplane. Flight, vol. 41, no. 15, Apr. 10, 1924, pp. 204–207, 11 figs. Describes some early experiments with a wing form in which lifting surfaces were circular in plan, with a circular piece cut out of center so as to leave a wing of annular shape.

Beams, Deflection of. Deflection of Beams with Special Reference to Shear Deformations. J. A. Newlin and G. W. Trayer. Nat. Advisory Committee for Aeronautics—Report, no. 180, 1924, 19 pp. 8 figs. Influence of form of wooden beam on its stiffness and strength.

British Empire Exhibition. Aeronautics. Engineering, vol. 117, no. 3043, Apr. 24, 1924, pp. 550–553, 8 figs., partly on supp. plates. Describes exhibits of Vickers and of Bristol Aeroplane Co. at Brit. Empire Exhibition.

Flying Boats. See FLYING BOATS.

Metal. Metal Airplane Construction (Ueber Metallflugzeugbau). Motorwagen, vol. 27, no. 11, Apr. 20, 1924, pp. 190–194. Comparisons between metal and wooden airplanes, showing advantages of former; properties of metals employed; heat treatment for annealing and for refining. Abstracted and translated into German from Russian journal, Westnik Wosduschnogo Flota.

Performance. Comparing the Performance of Geometrically Similar Airplanes, M. M. Munk. Nat. Advisory Committee for Aeronautics—Tech. Notes, no. 190, Apr. 1924, 27 pp. Deals with model rules relating to aeronautical problems, and shows how characteristics of one airplane can be determined from those of another of different weight or size, and of similar type.

Stability. Utilization of Laboratory Charts for Study of the Stability and Centering of Airplanes (L'Utilisation des Courbes de Laboratoire pour l'étude de la stabilité et du centrage des avions), J. Kernéis. Aérophile, vol. 32, nos. 3–4 and 5–6, Feb. 1–15 and Mar. 1–15, 1924, pp. 54–57 and 89–93, 12 figs. It is shown that with regard to stability, laboratory curves lead in very simple manner to desired result; it is essential, before using them, to change them with regard to center of gravity, which can be accomplished by aid of simple graphic method.

Stout Air Pullman. The Stout Air Pullman. Aviation, vol. 16, no. 20, May 19, 1924, pp. 533–534, 3 figs. America's first all-metal commercial plane, built in Detroit, is 7-passenger-and-pilot cabin transport designed for air-line work; engine is standard Liberty 400-hp. model, but fitted with new intake manifold which is latest development of Air Service; equipped with new type jump-gap Delco distributing system.

Strength Tests. Static Elastic and Breaking Tests of a Falco-Dornier Airplane with a 300-Hp. Hispano-Suiza Engine (Prova statica di elasticita e rottura dell'apparecchio "Falco Dornier" con motore "Hispano Suiza" 300 HP). Note Tecniche di Aeronautica, Jan. 1924, pp. 3–13, 12 figs. Describes tests made at Pisa in Dec., 1923, and gives results obtained.

Troop Carriers. The Armstrong-Whitworth "Awana" Troop-Carrier. Flight, vol. 41, no. 14, Apr. 3, 1924, pp. 187–190, 6 figs. Particulars of large biplane having two 450-hp. Napier Lion engines; span 105 ft. 6 in., length 68 ft., total loaded weight 18,450 lb.; cabin accommodates 25 troops with their kit.

Wings. Further Notes on the Design of Wing Spar Sections, E. P. Warner. Aviation, vol. 16, no. 14, Apr. 7, 1924, pp. 358–360, 2 figs. Supplementary to article by author in same journal, May 29, 1922, and to critical remarks by A. J. Sutton Pippard, July 17, 1922.

AIRSHIPS

Aerodynamic Forces on Hulls. The Aerodynamic Forces on Airship Hulls, M. M. Munk. Nat. Advisory Committee for Aeronautics—Report, no. 184, 1924, 20 pp., 4 figs. New method for making computations in connection with study of rigid airships, used in investigation of Navy's ZR-1; attempt is made to develop results from very fundamental of mechanics, without reference to some of modern highly developed conceptions.

ALLOYS

Aluminum. See ALUMINUM ALLOYS.

Bearing Metals. See BEARING METALS.

Brass. See BRASS.

British Practice. Useful New Alloys and Bronzes for Engineers, A. W. Jordon. Can. Foundryman, vol. 15, no. 3, Mar. 1924, pp. 13 and 15. British practice in engineering and foundry field.

Light. Light Alloys for Pistons and Connecting-Rods, L. Aitchison. Automobile Engr., vol. 14, no. 189, May 1924, pp. 148–155, 5 figs. Discusses advantages and disadvantages of light alloys for automobile-engine pistons and connecting rods.

Recent Progress in Light Alloys (Les alliages légers, leurs récents progrés), L. Guillet. Revue Universelle des Mines, vol. 67, no. 1, Apr. 1, 1924, pp. 7–36, 14 figs. Examination of alloys of aluminum and magnesium, their properties, influence of impurities, etc.

ALUMINUM ALLOYS

Aluminum-Copper. Heat Treatment of Aluminum-Copper Alloys, A. Portevin and F. Le Chatelier. Am. Soc. Steel Treating—Trans., vol. 5, no. 5, May

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NOTE.—The abbreviations used in indexing are as follows:

Academy (Acad.)
American (Am.)
Associated (Assoc.)
Association (Assn.)
Bulletin (Bul.)
Bureau (Bur.)
Canadian (Can.)
Chemical or Chemistry (Chem.)
Electrical or Electric (Elec.)
Electrician (Elecn.)
Engineer[s] (Engr.[s])
Engineering (Eng.)
Gazette (Gaz.)
General (Gen.)
Geological (Geol.)
Heating (Heat.)
Industrial (Indus.)
Institute (Inst.)
Institution (Instn.)
International (Int.)
Journal (Jl.)
London (Lond.)
Machinery (Machy.)
Machinist (Mach.)
Magazine (Mag.)
Marine (Mar.)
Materials (Matls.)
Mechanical (Mech.)
Metallurgical (Met.)
Mining (Min.)
Municipal (Mun.)
National (Nat.)
New England (N. E.)
Proceedings (Proc.)
Record (Rec.)
Refrigerating (Refrig.)
Review (Rev.)
Railway (Ry.)
Scientific or Science (Sci.)
Society (Soc.)
State names (Ill., Minn., etc.)
Supplement (Supp.)
Transactions (Trans.)
United States (U. S.)
Ventilating (Vent.)
Western (West.)

Classified List of Mechanical Equipment
Manufactured by Firms Represented in MECHANICAL ENGINEERING

FOR ALPHABETICAL LIST OF ADVERTISERS, SEE PAGE 152

Accumulators, Hydraulic
Farrel Foundry & Machine Co.
Mackintosh-Hemphill Co.
* Worthington Pump & Mchry. Corp'n

Aftercoolers, Air
* Ingersoll-Rand Co.

Agitators
Hill Clutch Machine & Fdry. Co

Air Compressors, Receivers, etc.
(See Compressors, Receivers, etc., Air)

Air Conditioning Apparatus
* American Blower Co.
* Carrier Engineering Corp'n
* Clarage Fan Co.
* Sturtevant, B. F. Co.

Air-Jet Lifts
* Schutte & Koerting Co.

Air Washers
* American Blower Co.
* Carrier Engineering Corp'n
* Clarage Fan Co.
* Cooling Tower Co. (Inc.)
* Sturtevant, B. F. Co.

Alloys
Driver-Harris Co.

Alloys (Calite)
Calorizing Co.

Ammeters
* Bristol Co.
* General Electric Co.
* Westinghouse Electric & Mfg. Co.

Anemometers
* Taylor Instrument Cos.
Weber, F. Co. (Inc.)

Annealing
* American Metal Treatment Co.
Nuttall, R. D. Co.

Arc Welding Equipment
* Westinghouse Elec. & Mfg. Co.

Arches, Boiler Furnace
* McLeod & Henry Co.
* Titusville Iron Works Co.

Arches, Fire Door
* McLeod & Henry Co.

Arches, Ignition (Flat Suspended)
* Combustion Engineering Corp'n
* McLeod & Henry Co.

Asbestos Products
Carey, Philip Co.
Garlock Packing Co.
Johns-Manville (Inc.)

Ash Lifts, Telescopic
Palmer-Bee Co.

Autoclaves
Farrel Foundry & Machine Co.

Babbitt Metal
* Medart Co.
* Westinghouse Elect. & Mfg. Co.

Ball Bearings, Gages, etc.
(See Bearings, Gages, Ball)

Balls, Brass and Bronze
* Atlas Ball Co.
* Gwilliam Co.

Balls, Steel
* Atlas Ball Co.
* Gwilliam Co.
* New Departure Mfg. Co.
* S K F Industries (Inc.)

Barometers
* American Schaeffer & Budenberg Corp'n
* Taylor Instrument Cos.

Barometers, Mercurial
* Tagliabue, C. J. Mfg. Co.

Bearings, Ball
Fafnir Bearing Co.
* Gwilliam Co.
Marlin-Rockwell Corp'n
* New Departure Mfg. Co.
* Norma Co. of America
* S K F Industries (Inc.)
* Strom Ball Bearing Mfg. Co.

Bearings, Collar Oiling
Hill Clutch Machine & Foundry. Co.

Bearings, Radial Thrust
* New Departure Mfg. Co.

Bearings, Roller
* Gwilliam Co.
* Hyatt Roller Bearing Co.
* Norma Co. of America
* Royersford Fdry. & Mach. Co.
* Timken Roller Bearing Co.

Bearings, Self-Oiling
* Brown, A. & F. Co.
* Doehler Die-Casting Co.
* Falls Clutch & Machinery Co.
Hill Clutch Machine & Fdry. Co.
* Jones, W. A. Fdry. & Mach. Co.
Link-Belt Co.
* Royersford Fdry. & Mach. Co.
* Wood's, T. B. Sons Co.

Bearings, Tapered
* Timken Roller Bearing Co.

Bearings, Thrust
Fafnir Bearing Co.
* General Electric Co.
* Gwilliam Co
Hill Clutch Machine & Fdry. Co.
* Norma Co. of America
* S K F Industries (Inc.)
* Timken Roller Bearing Co.
* Strom Ball Bearing Mfg. Co.

Belt Dressing
* Dixon, Joseph Crucible Co.
Gandy Belting Co.

Belt Lacing, Steel
* Bristol Co.

Belt Tighteners
* Brown, A. & F. Co.
Hill Clutch Machine & Fdry. Co.
* Jones, W. A. Fdry. & Mach. Co.
Link-Belt Co.
* Medart Co.
* Smidth, F. L. & Co.
* Wood's, T. B. Sons Co.

Belt Tighteners, Automatic
Hill Clutch Machine & Foundry Co.

Belting, Canvas (Stitched)
Gandy Belting Co.
* U. S. Rubber Company

Belting, Conveyor
Gandy Belting Co.
* Goodrich, B. F. Rubber Co.
* United States Rubber Co.

Belting, Elevator
Gandy Belting Co.
* Goodrich, B. F. Rubber Co.
* United States Rubber Co.

Belting, Endless
Gandy Belting Co.

Belting, Fabric
Gandy Belting Co.

Belting, Leather
American Sole & Belting Leather Tanners (Inc.)

Belting, Rubber
* Goodrich, B. F. Rubber Co.
* United States Rubber Co.

Belting, Waterproof
Gandy Belting Co.

Bending & Straightening Machines
* Long & Allstatter Co.

Bends, Pipe
* Frick Co. (Inc.)
* Vogt, Henry Machine Co.

Billets, Steel
* Timken Roller Bearing Co.

Blocks, Tackle
Clyde Iron Work Sales Co.
* Roebling's, John A. Sons Co.

Blowers, Centrifgual
* American Blower Co.
* Clarage Fan Co.
* Coppus Engineering Corp'n
* De Laval Steam Turbine Co.
* General Electric Co.
* Ingersoll-Rand Co.
* Kerr Turbine Co.
* Sturtevant, B. F. Co.
* Westinghouse Electric & Mfg. Co.

Blowers, Fan
* American Blower Co.
* Clarage Fan Co.
* Coppus Engineering Corp'n
* Green Fuel Economizer Co.
* Sturtevant, B. F. Co.

Blowers, Forge
* American Blower Co.
* Sturtevant, B. F. Co.

Blowers, Pressure
* American Blower Co
* Clarage Fan Co.
Lammert & Mann Co
* Sturtevant, B. F. Co.

Blowers, Rotary
Fletcher Works
Lammert & Mann Co.
* Schutte & Koerting Co.
* Sturtevant, B. F. Co.

Blowers, Soot
Diamond Power Specialty Corp'n
* Sturtevant, B. F. Co.

Blowers, Steam Jet
* Schutte & Koerting Co.

Blowers, Turbine
* Coppus Engineering Corp'n
* Sturtevant, B. F. Co.

Blueing (Metal)
* American Metal Treatment Co.

Boards, Drawing
Dietzgen, Eugene Co.
Keuffel & Esser Co.
New York Blue Print Paper Co.
ParVell Laboratories
U. S. Blue Co.
Weber, F. Co. (Inc.)

Boiler Baffles
* King Refractories Co. (Inc.)
* McLeod & Henry Co.

Boiler Compounds
* Dixon, Joseph Crucible Co.
Unisol Mfg. Co.

Boiler Coverings, Furnaces, Tube Cleaners, etc.
(See Coverings, Furnaces, Tube Cleaners, etc., Boiler)

Boiler Fronts
* O'Brien, John Boiler Works Co.
* Titusville Iron Works Co.

Boiler Settings, Steel Cased
* Casey-Hedges Co.
* McLeod & Henry Co.
* O'Brien, John Boiler Works Co.
* Vogt, Henry Machine Co.
* Walsh & Weidner Boiler Co.

Boilers, Heating
* Casey-Hedges Co.
* Erie City Iron Works
* Keeler, E. Co.
* Leffel, James & Co.
Lidgerwood Mfg. Co.
* O'Brien, John Boiler Works Co.
* Titusville Iron Works Co.
* Union Iron Works
* Walsh & Weidner Boiler Co.

Boilers, Locomotive
* Casey-Hedges Co.
* Keeler, E. Co.
* Leffel, James & Co.
* Titusville Iron Works Co.
* Union Iron Works
* Walsh & Weidner Boiler Co.

Boilers, Marine (Scotch)
Bethlehem Shipbldg.Corp'n(Ltd.)
* Casey-Hedges Co.
* Leffel, James & Co.
* Titusville Iron Works Co.
* Walsh & Weidner Boiler Co.

Boilers, Marine (Water Tube)
* Babcock & Wilcox Co.
Bethlehem Shipbldg.Corp'n(Ltd.)
* Casey-Hedges Co.
* Connelly, D. Boiler Co.
* O'Brien, John Boiler Works Co.
* Springfield Boiler Co.
* Titusville Iron Works Co.
* Walsh & Weidner Boiler Co.
* Ward, Charles Engineering Wks.

Boilers, Portable
* Casey-Hedges Co.
* Erie City Iron Works
* Frick Co. (Inc.)
* Keeler, E. Co.
* Leffel, James & Co.
Lidgerwood Mfg. Co.
* O'Brien, John Boiler Works Co
* Titusville Iron Works Co.
* Union Iron Works
* Walsh & Weidner Boiler Co.

Boilers, Tubular (Horizontal Return)
* Bigelow Co.
* Casey-Hedges Co.
* Cole, R. D. Mfg. Co.
* Connelly, D. Boiler Co.
* Erie City Iron Works
* Keeler, E. Co.
* Leffel, James & Co.
Lidgerwood Mfg. Co.
Morrison Boiler Co.
* O'Brien, John Boiler Works Co.
* Titusville Iron Works Co.
* Union Iron Works
* Vogt, Henry Machine Co.
* Walsh & Weidner Boiler Co.
* Ward, Charles Engineering Wks.
* Webster, Howard J.
* Wickes Boiler Co.

Boilers, Tubular (Vertical Fire)
* Bigelow Co.
* Casey-Hedges Co.
Clyde Iron Works Sales Co.
* Keeler, E. Co.
* Leffel, James & Co.
Lidgerwood Mfg. Co.
Morrison Boiler Co.
* O'Brien, John Boiler Works Co.
* Titusville Iron Works Co.
* Union Iron Works
* Walsh & Weidner Boiler Co.

Boilers, Water Tube (Horizontal)
* Babcock & Wilcox Co.
Bethlehem Shipbldg.Corp'n(Ltd.)
* Casey-Hedges Co.
* Cole, R. D. Mfg. Co.
* Connelly, D. Boiler Co.
* Edge Moor Iron Co.
* Erie City Iron Works
* Keeler, E. Co.
* Ladd, George T. Co.
Morrison Boiler Co.
* O'Brien, John Boiler Works Co.
* Springfield Boiler Co.
* Union Iron Works
* Vogt, Henry Machine Co.
* Walsh & Weidner Boiler Co.
* Wickes Boiler Co.

Boilers, Water Tube (Inclined)
* Babcock & Wilcox Co.
Bethlehem Shipbldg.Corp'n(Ltd.)
* Bigelow Co.
* Casey-Hedges Co.
* Keeler, E. Co.
* Ladd, George T. Co.
Morrison Boiler Co.
* O'Brien, John Boiler Works Co.
* Vogt, Henry Machine Co.
* Walsh & Weidner Boiler Co.
* Ward, Charles Engineering Wks.

Boilers, Water Tube (Vertical)
* Babcock & Wilcox Co.
* Bigelow Co.
* Casey-Hedges Co.
* Erie City Iron Works
* Keeler, E. Co.
* Ladd, George T. Co.
Morrison Boiler Co.
* O'Brien, John Boiler Works Co.
* Walsh & Weidner Boiler Co.
* Wickes Boiler Co.

Boring and Drilling Machines
Universal Boring Machine Co.

Boring, Drilling and Milling Machines (Horizontally Combined)
Universal Boring Machine Co.

Boxes, Carbonizing
Driver-Harris Co.

Boxes, Case Hardening
Driver-Harris Co.

Boxes, Water Service
Murdock Mfg. & Supply Co.

Brake Blocks
Johns-Manville (Inc.)

Brakes, Air
* Allis-Chalmers Mfg. Co.
* General Electric Co.

Brass Goods
* Scovill Mfg. Co.

Brass Mill Machinery
Farrel Foundry & Machine Co.

Breechings, Smoke
Morrison Boiler Co.
* Titusville Iron Works Co.
* Vogt, Henry Machine Co.

*Catalogue data of firms marked * appear in the A.S.M.E. Condensed Catalogues of Mechanical Equipment. 1923-24 Volume*

1924, pp. 457–478, 14 figs. Study of properties of light aluminum alloys containing varying proportions of copper, manganese and magnesium; discusses characteristics of alloys containing copper, with and without magnesium; heat treatment and aging, and their effect upon physical properties; hypotheses explaining constitution of aluminum-copper-manganese-magnesium alloys.

Aluminum-Silicon. Aluminum-Silicon Alloys, J. B. Swan. Automobile Engr., vol. 14, no. 188, Apr. 1924, pp. 102–105, 10 figs. Their properties and limitations; aluminum-silicon binary system; making up and casting alloy; reversion; aluminum-silicon as forging and cold-worked metal; effects of heat treatment.

Castings, Hard Spots in. Study Aluminum Hard Spots. A. J. Lyon. Foundry, vol. 52, no. 10, May 15, 1924, pp. 396–397. Methods employed to identify inclusions, and determine effect on mechanical properties, and metallographic structure of oxidizing aluminum cast alloys during melting.

See also ALLOYS, Light.

AMMONIA

Anhydrous. Is Anhydrous Ammonia Combustible?, W. F. Schaphorst. Nat. Engr., vol. 28, no. 5, May 1924, pp. 220–221. Opinions of authorities and experts, from which it appears that it is feebly combustible under certain conditions but normally incombustible and actually a retardent of combustion in many cases.

AMMONIA COMPRESSORS

Compound Compression. Effect of Compound Compression of Ammonia, J. E. Starr. Power Plant Eng., vol. 28, No. 8, Apr. 15, 1924, pp. 445–446, 1 fig. Cost of extra equipment, it is claimed, will in most cases offset thermodynamic gains which would result from compound compression.

ASH HANDLING

Power Plants. The Disposal of Ashes in Power Plants, E. K. Scott. Power Engr., vol. 19, nos. 215, 216 and 217, Feb., Mar. and Apr., 1924, pp. 55–56, 90–92 and 145–147, 16 figs. Survey of present practice. Feb.: Trucks and skips; bucket and tray conveyors; scraper and belt conveyor. Mar.: Sluicing ash conveyor.

AUTOMOBILE ENGINES

Corrosion. Undue Wear of Engine Parts is Caused by Rust. Automotive Industries, vol. 50, no. 18, May 1, 1924, pp. 956–958, 2 figs. Three hypotheses analyzed in research work conducted in Gen. Motors Corp., namely, acid, oxide and electrolytic theory, all of which agree that presence of moisture is necessary.

Fuel-Feed Apparatus. Tests with Fuel Feed Apparatus (Einige Versuche mit Brennstoff-Förderapparaten), R. Conrad. Motorwagen, vol. 27, no. 5, Feb. 20, 1924, pp. 65–75, 16 figs. Measurement results with underpressure apparatus and with a combined underpressure and overpressure suction apparatus.

Lycoming. 8-in-Line Engine is Latest Product of Lycoming. Automotive Industries, vol. 50, no. 20, May 15, 1924, pp. 1066–1067, 4 figs. Cylinders are cast in single block and are of L-head type; dimensions will be varied for particular cars, but on first models built bore is 3 1/8 in. and stroke 4 1/4 in.; pistons are of cast iron; inlet and exhaust manifolds are combined.

Oil Rectifiers. Rickenbacker Incorporates Skinner Rectifier in All New Models. Automotive Industries, vol. 50, no. 20, May 15, 1924, pp. 1086–1087, 2 figs. Oil drawn from around piston by inlet suction is subject to distillation process by hot exhaust gases, fuel driven off being returned to intake manifold.

Radiator Cores. New McCord Radiator Core Stamped from Ribbon Brass. Automotive Industries, vol. 50, no. 20, May 15, 1924, pp. 1084–1085, 4 figs. Entire structure with integral fins is built up by means of progressive multiple die which forms tubes that project from strips running continuously through press; tinned sections are stacked, forced together, and baked to sweat all joints.

AUTOMOBILE FUELS

Lignite as Source of. Lignites and the Manufacture of Automobile Fuel (Les lignites et la fabrication des carburants), E. Marcotte. Revue Industrielle, vol. 54, no. 2178, May 1924, pp. 85–94, 5 figs. Notes on extraction of light products; classification of possible treatments; recovery of benzol; objections against distillation of lignite; hydrogenation; Bergius process and its industrial application; liquefaction direct from coal; Mélamid process; Fischer and Schrader processes.

AUTOMOBILES

Bodies, Finishing. High Brake Pre-Enameled Panels Used in Body Construction. Automotive Mfr., vol. 66, no. 1, Apr. 1924, pp. 9–11, 4 figs. Details of new type of construction which permits easy application of hard permanent finish to metal panels applied over conventional wood frame.

Ultra-Violet Rays Used to Test Body Fabrics and Finishes, W. L. Carver. Automotive Industries, vol. 50, no. 19, May 8, 1924, pp. 1011–1014, 5 figs. Few hours of exposure under suitable conditions may be equal to many months of natural weathering; utilization of quartz-tube mercury-vapor lamp which emits ultra-violet rays, which may also be employed to dry varnish.

Brakes. Study of Gripper Brakes for Automobiles and Lifting Devices (L'étude des freins à machoires pour automobiles et appareils de levage). Génie Civil, vol. 84, no. 19, May 10, 1924, pp. 452–454, 4 figs. General considerations on functioning of brakes; elementary calculation; distribution of pressure; determination of bending.

Brakes, Four-Wheel. Four-Wheel Braking Systems, F. A. Stepney Acres. Automobile Engr., vol. 14, no. 188, Apr. 1924, pp. 115–118, 4 figs. Arrangement of brakes; brake-power ratio; mechanical difficulties; pedal leverage; central steering; compensation; mechanical difficulties; front springs; brake-rod layout.

Chassis Lubrication. Chassis Lubrication Is Simplified by Bowen System. Automotive Industries, vol. 50, no. 16, Apr. 17, 1924, pp. 876–878, 9 figs. Designed to deliver accurately measured quantities of oil to each bearing slowly for several hours after pump plunger is depressed; air domes over each header valve serve important purpose in metering and controlling flow; special tubing used.

Clyno. The 11 Hp. Clyno Light Car. Auto-Motor Jl., vol. 29, no. 17, Apr. 24, 1924, pp. 347–350, 10 figs. Comfortable body-work, ease of operation and economy in running; 66-mm. bore and 100-mm. stroke; capable of an output of 16 hp. on brake at 1500 r.p.m. and 25 hp. at 2950 r.p.m.

Gear Boxes. New Morris Production Methods. Machy. (Lond.), vol. 24, no. 602, Apr. 10, 1924, pp. 33–38, 11 figs. Machines and methods used by Morris Engines, Ltd., Coventry, in grinding spline shafts and gears for automobile gear boxes.

German. A New German Two-Seater (Ein neuer deutscher Kleinauto-Zweisitzer), H. Werner. Motorwagen, vol. 27, no. 8, Mar. 20, 1924, pp. 135–136, 1 fig. 1.9/6.5-hp. BZ small car with light-metal body.

Light Cars. The 9.8 Hp. Lea and Francis Chassis. Automobile Engr., vol. 14, no. 188, Apr. 1924, pp. 94–101, 17 figs. Light car in which good performance has been secured by reducing dead weight.

Rear Axles, Machining. Maxwell Methods in Making Rear Axle Parts, F. H. Colvin. Am. Mach., vol. 60, no. 118, May 1, 1924, pp. 661–663, 7 figs. Rear-axle housing and drive pinion; fixtures used in production; grinding two diameters at once; special mounting for truing diamonds.

Renault. The Second and Third Trips Across the Sahara Desert by Automobile (Les 2e et 3e traversées du Sahara en automobile), G. Delanghe. Génie Civil, vol. 84, no. 2172, Mar. 29, 1924, pp. 293–297, 13 figs. Renault automobiles with six double wheels; details of chassis; comparison of different systems of 6-wheel chassis.

Rover. The 14 Hp. Rover Chassis. Automobile Engr., vol. 14, no. 189, May 1924, pp. 126–134, 14 figs. General arrangement and principal features of medium-weight car of orthodox design.

Singer. The Singer Six. Auto-Motor Jl., vol. 29, no. 16, Apr. 17, 1924, pp. 327–331, 14 figs. 15-hp. 6-cylindered model of British firm; cylinders bored to 65 mm. diam., and crank throw of 100 mm.

Streamline. A Streamlining Development. Autocar, vol. 52, no. 1486, Apr. 11, 1924, pp. 662–664, 7 figs. Unconventional body designed by a Danish engineer, P. Forostovsky, Jr., and fitted to a 2-liter Bignan chassis; head resistance diminished; resulting in reduced power and gasoline consumption; but with no loss of comfort.

Windsor. The 10–15 Hp. Windsor Car. Auto-Motor Jl., vol. 29, no. 15, Apr. 10, 1924, pp. 305–309, 11 figs. British-built car designed with a view to comfort and mechanical efficiency; 4-cylinder engine with 65-mm. bore and 102-mm. piston stroke.

AVIATION

Naval. Naval Aviation Today, F. W. Wead. U. S. Naval Inst. Proc., vol. 50, no. 254, Apr. 1924, pp. 561–574. Use of individual types of lighter-than-air machines, with certain observations as to material and general doctrine.

Night-Flying Equipment. Night-Flying Equipment and Operation, H. R. Harris and D. L. Bruner. Mech. Eng., vol. 46, no. 5, May 1924, pp. 274–278, 9 figs. Non-mathematical discussion of portion of work carried on by Engineering Division of Air Service; much of equipment developed has been adapted by Air Mail Service. (Abridged.)

Terminals. The Future of the Air Terminal, D. Huntington. Aviation, vol. 16, no. 16, Apr. 21, 1924, pp. 423–425, 3 figs. Importance of air terminals; influence of carriers on terminal design; evolution of field-type terminal; location with respect to community; ideal location of airport; municipal-terminal idea; detail problems.

B

BEARING METALS

Durex. Durex, a Bearing Material Which Holds Oil Like a Sponge. Automotive Industries, vol. 50, no. 20, May 15, 1924, pp. 1072–1074, 14 figs. Copper-tin-graphite bronze which absorbs up to one-fourth its own volume by capillarity through myriads of tiny, evenly distributed pores, and maintains oily bushing surface; offers insurance against shortage or stoppage of lubrication.

BEARINGS

Anti-Friction. Anti-Friction Bearings Lower Transportation Costs from Face to Railroad Car, F. H. Kneeland. Coal Age, vol. 25, no. 17, Apr. 24, 1924, pp. 603–606, 5 figs. Need only one-fourth as many applications of lubricant as plain bearings and have nearly twice as long life; lubrication cost reduced by two-thirds; save power and equipment.

Babbitting Brasses. Babbitting Brasses for Subway Trains, F. H. Colvin. Am. Mach., vol. 60, no. 17, Apr. 24, 1924, pp. 629–630, 4 figs. Methods and equipment in babbitting room of New York 148th St. shop; simple mandrels used for holding brasses in position for babbitting; two men handle four tons of babbitt per month.

Cylindrical. The Design and Performance of Complete Cylindrical Bearings from Mathematical Theory of Lubrication, G. B. Upton. Sibley Jl. of Eng., vol. 38, nos. 3 and 4, Mar. and Apr. 1924, pp. 56–60 and 76, and 97–100, 6 figs. Presentation and discussion of Harrison's equations; and modifications brought about by finite length and its consequences in end leakage of lubricant and lengthwise variation of pressure in lubricating film.

Experiments. Some Bearing Investigations, E. G. Gilson. Gen. Elec. Rev., vol. 27, no. 5, May 1924, pp. 318–327, 20 figs. Results of investigation made by Research Laboratory of Gen. Elec. Co. into phenomena of bearings.

Railway-Motor, Lubrication of. Packing Railway Motor Bearings for Oil Lubrication, C. Bethel. Elec. Ry. Jl., vol. 63, no. 16, Apr. 19, 1924, pp. 605–609, 13 figs. Method of packing bearings; wood waste is most satisfactory, but care must be used to insure feeding proper quantity of oil; essentials are to keep shell tight and clearance small; proper design of oil grooves necessary.

BEARINGS, BALL

Life. The Life of Ball Bearings (Die Lebensdauer von Kugellagern), A. Palmgren. Zeit. des Vereines deutscher Ingenieure, vol. 68, no. 14, Apr. 5, 1924, pp. 339–341. Shows that life of ball bearings subjected to axial or combined stresses depends partly on maximum developed ball pressure and partly on fatigue phenomena which have changed in comparison to conditions with purely radial load.

BELT DRIVE

Short-Center. Short Belt Drives, V. Sahmel. Paper Trade Jl., vol. 78, no. 19, May 8, 1924, pp. 61–64, 7 figs. Fundamental formula for belt drives; advantages of short-center drive; floating idlers, beaters, etc.

BLAST FURNACES

Charge, Behavior of. The Behavior of the Charge in Blast Furnaces (Ueber das Verhalten der Beschickung im Hochofen), E. Diepschlag. Stahl u. Eisen vol. 44, no. 16, Apr. 17, 1924, pp. 430–432. Heating and reactions; lowering and suspension of charges; wastes.

Regenerators, Reversing. Theoretical Considerations Respecting Certain Features in the Working and Efficiency of Reversing Regenerators, J. Seigle. Iron & Steel Inst.—advance paper, no. 14, for mtg. May 1924, 47 pp., 28 figs. Author seeks to show that certain relations which have been accepted in metallurgical investigations on influence of mass of refractory bricks of checkerwork, and on amount of calories which are exchanged per sq. m. of heated surface, have been somewhat too roughly approximate.

BLOWERS

Regulations. Report of Committee on Blower Systems. Nat. Fire Protection Assn., Advance Publication, 1924, 13 pp., 6 figs. Regulations for installation of blower and exhaust systems for heating and ventilating systems, systems for removal of flammable vapors, and stock and refuse-conveying systems, presented for final adoption.

BOILER FEEDWATER

System. Boiler Feed System in Sugar Refinery, Claude C. Brown. Power Plant Eng., vol. 28, no. 9, May 1, 1924, pp. 482–485, 4 figs. Fresh-water make-up, storage systems, filters, softeners, and feedwater testing.

BOILER FIRING

Gas. Gas Firing—Flame Control, A. C. Ionides, Jr. Gas Jl., vol. 166, no. 3179, Apr. 16, 1924, pp. 176–178 and (discussion) 178–179, 2 figs. Author claims that principles of gas firing mostly employed hitherto are fundamentally wrong; discloses grounds for such a conclusion and establishes an alternative method. See also Gas Wld., vol. 80, no. 2073, Apr. 12, 1924, pp. 334–336 and (discussion) 336–337, 1 fig.

BOILER FURNACES

Air Preheating. The Use of Preheated Air and Exhaust Gases for Boiler Furnaces (Ueber die Verwendung von vorgewärmter Luft und von Abgasen für Kesselfeuerungen), W. Deinlein. Zeit. des Bayerischen Revisions-Vereins, vol. 28, no. 5, Mar. 15, 1924, pp 29–33. Numerical determination of furnace and waste-gas temperatures, fuel consumption, etc., when heating with crude lignite, Bavarian and Ruhr coal.

Combustion Control. Control of Combustion Processes in Furnaces (Excess Air and Efficiency) [Beurteilung und Kontrolle der Verbrennungsvorgänge bei Feuerungen (Luftüberschuss und Leistung)], A. Dosch. Feuerungstechnik, vol. 12, nos. 13 and 14, Apr. 1 and 15, 1924, pp. 107–109 and 116–117, 9 figs. Control device for excess air and stress; scale diagrams.

Design. Problems in Boiler Furnace Design, E. B. Ricketts. Power Plant Eng., vol. 28, no. 9, May 1, 1924, pp. 473–476, 5 figs. Changes in stoker design, high ratings, high capacities, etc.; value of air heaters; materials for furnace-wall construction; effect of high combustion efficiency on superheat; mixing of boiler-furnace gases. Paper presented before Metropolitan Section of A.S.M.E.

Induced-Draft Installations. Calculation of Induced-Draft Installations (Berechnung einer Saugzug-Anlage), H. R. Karg. Fördertechnik u. Frachtverkehr, vol. 17, no. 6, Mar. 20, 1924, pp. 76–79. Calculation of induced-draft plant and auxiliary exhaustor; determination of excess air.

Low Temperature-Tar Plant. Boiler Furnace with Low-Temperature-Tar Recovery Plant (Dampfkesselfeuerung mit Urteergewinnungsanlage). Wärme- u. Kälte-Technik, vol. 26, no. 5, Mar. 1, 1924, pp. 33–35, 4 figs. Grate furnace with distillation shaft installed in front for production of low-temperature tar from combustion gases of boiler furnaces, according to process developed by B. Meyer; advantages of system.

Manufactured by Advertisers — CLASSIFIED LIST OF MECHANICAL EQUIPMENT — Alphabetical List on page 152

Brick, Fire
* Bernitz Furnace Appliance Co.
* Celite Products Co.
* Drake Non-Clinkering Furnace Block Co.
Keystone Refractories Co.
* King Refractories Co. (Inc.)
* McLeod & Henry Co.
Maphite Sales Corp'n

Brick, Insulating
* Celite Products Co.
* Quigley Furnace Specialties Co.

Bridges, Coal and Ore Handling
* Brown Hoisting Machinery Co.
Link-Belt Co.

Bridgewalls (Furnace)
* McLeod & Henry Co.

Buckets, Elevator
* Brown Hoisting Machinery Co.
Chain Belt Co.
* Gifford-Wood Co.
* Hendrick Mfg. Co.
* Jones, W. A. Fdry. & Mach. Co.
Link-Belt Co.
Palmer-Bee Co.

Buckets, Grab
* Brown Hoisting Machinery Co.
Clyde Iron Works Sales Co.
Lidgerwood Mfg. Co.
Link-Belt Co.

Buckets, Self-Dumping
* Brown Hoisting Machinery Co.
Clyde Iron Works Sales Co.
Link-Belt Co.

Burners, Oil
Bethlehem Shipbldg.Corp'n(Ltd.)
* Combustion Engineering Corp'n
* Schutte & Koerting Co.

Burners, Powdered Fuel
Grindle Fuel Equipment Co.
* Quigley Furnace Specialties Co.

Bushings, Bronze
Hill Clutch Mach. & Fdry. Co.
* Wood's, T. B. Sons Co.

Cabinets and Tables, Blue Print Filing
Dietzgen, Eugene Co.
Economy Drawing Table & Mfg. Co.
Keuffel & Esser Co.
ParVell Laboratories
U. S. Blue Co.
Weber, F. Co. (Inc.)

Cableways, Excavating
Lidgerwood Mfg. Co.

Cableways, Hoisting and Conveying
Lidgerwood Mfg. Co.

Calorimeters
* American Schaeffer & Budenberg Corp'n
* Sarco Co. (Inc.)

Calorizing
Calorizing Co.

Cars, Charging
Easton Car & Construction Co.
* Whiting Corp'n

Cars, Industrial Railway
Easton Car & Construction Co.
Link-Belt Co.
* Whiting Corp'n

Cars, Trolley (Industrial Railway)
Link-Belt Co.

Casehardening
* American Metal Treatment Co.
Nuttall, R. D. Co.

Casings, Steel (Boiler)
* Casey-Hedges Co.
* Vogt, Henry Machine Co.
* Walsh & Weidner Boiler Co.

Castings, Acid Resistant
* U. S. Cast Iron Pipe & Fdry. Co.

Castings, Aluminum
Buffalo Bronze Die Casting Corp'n
DuPont Engineering Co.

Castings, Brass
* Croll-Reynolds Engineering Co.
Du Pont Engineering Co.

Castings, Bronze
Buffalo Bronze Die Casting Corp'n

Castings, Die-Molded
* Doehler Die-Casting Co.
Veeder Mfg. Co.

Castings, Heavy
Farrel Foundry & Machine Co.
Hill Clutch Mach. & Fdry. Co.
* U. S. Cast Iron Pipe & Fdry. Co.

Castings, Iron
Bethlehem Shipbldg.Corp'n(Ltd.)
* Brown, A. & F. Co.
* Builders Iron Foundry
* Burhorn, Edwin Co.
* Casey-Hedges Co.
* Central Foundry Co.
Chain Belt Co.
* Cole, R. D. Mfg. Co.
* Croll-Reynolds Engineering Co.
DuPont Engineering Co.
* Falls Clutch & Machinery Co.
Farrel Foundry & Machine Co.
* Franklin Machine Co.
Garlock Packing Co.
* Harrisburg Fdry. & Mach. Wks.
Hill Clutch Machine & Fdry. Co.
* Jones, W. A. Fdry. & Mach. Co.
Lidgerwood Mfg. Co.
Link-Belt Co.
* Nordberg Mfg. Co.
* Pittsburgh Valve, Fdry. & Const. Co.
* Royersford Fdry. & Mach. Co.
Treadwell Engineering Co.
* U. S. Cast Iron Pipe & Fdry. Co.
* Vogt, Henry Machine Co.

Castings, Monel Metal
Driver-Harris Co., (In Canada)

Castings, Nichrome
Driver-Harris Co.

Castings, Nickel Chromium
Driver-Harris Co.

Castings, Semi-Steel
* Builders Iron Foundry
Chain Belt Co.
* Croll-Reynolds Engrg. Co. (Inc.)
Farrell Foundry & Machine Co.
Hill Clutch Machine & Fdry. Co.
Link-Belt Co.
* Nordberg Mfg. Co.
* Vogt, Henry Machine Co.

Castings, Steel
* Falk Corporation
Link-Belt Co.
Mackintosh-Hemphill Co.
* Reading Steel Casting Co. (Inc.)
(Reading Valve & Fittings Div.)
Treadwell Engineering Co.

Castings, White Metal
* Doehler Die-Casting Co.

Cement, Asbestos
Carey, Philip Co.

Cement, Iron and Steel
Smooth-On Mfg. Co.

Cement, Pipe Joint
Smooth-On Mfg. Co.

Cement, Refractory
* Celite Products Co.
Johns-Manville (Inc.)
* King Refractories Co. (Inc.)
* Quigley Furnace Specialties Co.

Cement, Water-Resistant
Smooth-On Mfg. Co.

Cement Machinery
* Allis-Chalmers Mfg. Co.
Hill Clutch Mach. & Fdry. Co.
Link-Belt Co.
* Smidth, F. L. & Co.
* Worthington Pump & Machinery Corp'n

Centrifugals, Chemical
Fletcher Works
Tolhurst Machine Works

Centrifugals, Metal Drying
Tolhurst Machine Works

Centrifugals, Sugar
Fletcher Works
Tolhurst Machine Works
* Worthington Pump & Mchry. Corp'n

Chain Belts and Links
Chain Belt Co.
* Diamond Chain & Mfg. Co.
* Gifford-Wood Co.
* Jones, W. A. Fdry. & Mach. Co.
Link-Belt Co.
Union Chain & Mfg. Co.
* Whitney Mfg. Co.

Chains, Block
Palmer-Bee Co.

Chains, Power Transmission
Baldwin Chain & Mfg. Co.
Chain Belt Co.
* Diamond Chain & Mfg. Co.
Link-Belt Co.
* Morse Chain Co.
Union Chain & Mfg. Co.
* Whitney Mfg. Co.

Charging Machines
* Whiting Corp'n

Chimneys, Brick (Radial)
Morrison Boiler Co.

Chucking Machines
* Jones & Lamson Machine Co.
* Warner & Swasey Co.

Chucks, Drill
* S K F Industries (Inc.)
* Whitney Mfg. Co.

Chucks, Tapping
* Whitney Mfg. Co.

Chutes
Chain Belt Co.
* Gifford-Wood Co.
* Hendrick Mfg. Co.
Link-Belt Co.

Circuit Breakers
* General Electric Co.
* Westinghouse Elec. & Mfg. Co.

Circulators, Feed Water
* Schutte & Koerting Co.

Circulators, Steam Heating
* Schutte & Koerting Co.

Cloth, Rubber
Garlock Packing Co.
* Goodrich, B. F. Rubber Co.

Cloth, Tracing
Dietzgen, Eugene Co.
Keuffel & Esser Co.
New York Blue Print Paper Co.
ParVell Laboratories
U. S. Blue Co.
Weber, F. Co. (Inc.)

Clutches, Friction
* Allis-Chalmers Mfg. Co.
* Brown, A. & F. Co.
* Falls Clutch & Machinery Co.
Farrell Foundry & Machine Co.
Fletcher Works
* Gifford-Wood Co.
Hill Clutch Mach. & Fdry. Co.
Johnson, Carlyle Machine Co.
* Jones, W. A. Fdry. & Mach. Co.
Link-Belt Co.
* Medart Co.
Philadelphia Gear Works
* Western Engineering & Mfg. Co.
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Coal
Pennsylvania Coal & Coke Co.

Coal and Ash Handling Machinery
* Brown Hoisting Machinery Co.
Chain Belt Co.
* Gifford-Wood Co.
Link-Belt Co.
Palmer-Bee Co.

Coal Bins
* Brown Hoisting Machinery Co.
Chain Belt Co.
Link-Belt Co.

Coal Breakers and Cleaners
Pennsylvania Crusher Co.

Coal Mine Equipment and Supplies
* General Electric Co.

Coal Mining Machinery
* General Electric Co.
* Ingersoll-Rand Co.

Coal Preparing Equipment
Grindle Fuel Equipment Co.

Coaling Stations, Locomotive
Chain Belt Co.
* Gifford-Wood Co.
Link-Belt Co.

Cocks, Air and Gage
* American Schaeffer & Budenberg Corp'n
* Ashton Valve Co.
* Crane Co.
* Jenkins Bros.
Lunkenheimer Co.
* Reading Steel Casting Co. (Inc.)
(Pratt & Cady Division)
* Vogt, Henry Machine Co.

Cocks, Blow-off
* Crane Co.
Lunkenheimer Co.
* Pittsburgh Valve, Fdry. & Const. Co.
* Reading Steel Casting Co. (Inc.)
(Pratt & Cady Division)

Cocks, Three-Way and Four-Way
* American Schaeffer & Budenberg Corp'n
* Crane Co.
* Crosby Steam Gage & Valve Co.
Lunkenheimer Co.
* Pittsburgh Valve, Fdry. & Const. Co.
* Reading Steel Casting Co. (Inc.)
(Pratt & Cady Division)

Coils, Pipe
* Superheater Co.
* Vilter Mfg. Co.
* Vogt, Henry Machine Co.

Coke
Pennsylvania Coal & Coke Co.

Cold Storage Plants
* De La Vergne Machine Co.

Collars, Shafting
Chain Belt Co.
Hill Clutch Machine & Fdry. Co.
Link-Belt Co.
* Medart Co.
* Royersford Fdry. & Mach. Co.
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* Sarco Co. (Inc.)
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* Allis-Chalmers Mfg. Co.
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* Ingersoll-Rand Co.
Mackintosh-Hemphill Co.
* Nordberg Mfg. Co.
* Titusville Iron Works Co.
* Wayne Tank & Pump Co.
* Worthington Pump & Machinery Corp'n

Compressors, Air, Centrifugal
* De Laval Steam Turbine Co.
* General Electric Co.

Compressors, Air, Compound
* Ingersoll-Rand Co.
* Nordberg Mfg. Co.
* Worthington Pump & Machinery Corp'n

Compressors, Ammonia
* Frick Co. (Inc.)
* Ingersoll-Rand Co.
* Vilter Mfg. Co.
* Vogt, Henry Machine Co.
* Worthington Pump & Machinery Corp'n

Compressors, Gas
* De Laval Steam Turbine Co.
* General Electric Co.
* Ingersoll-Rand Co.
* Nordberg Mfg. Co.
* Worthington Pump & Machinery Corp'n

Condensers, Ammonia
* De La Vergne Machine Co.
* Frick Co. (Inc.)
* Ingersoll-Rand Co.
* Vilter Mfg. Co.
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* Allis-Chalmers Mfg. Co.
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* Allis-Chalmers Mfg. Co.
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* Westinghouse Electric & Mfg. Co.

*Catalogue data of firms marked * appear in the A.S.M.E. Condensed Catalogues of Mechanical Equipment. 1923-24 Volume*

BOILER PLANTS

Flue-Dust Conveyors. Pneumatic Flue Dust Conveyors, K. Wagner. Eng. Progress, vol. 5, no. 4, Apr. 1924, pp. 61–64, 7 figs. Suction plant designed by Seck Bros., Dresden, erected in boiler room; experience gained in service.

BOILER PLATES

Strength of. The Distribution of Strength Properties in a Sheet-Iron Plate (Die Verteilung der Festigkeitseigenschaften innerhalb einer Blechtafel), E. Koch. Zeit. des Bayerischen Revisions-Vereins, vol. 28, nos. 3-4, 5 and 6, Feb. 29, Mar. 15 and 31, 1924, pp. 13–19, 33–38, and 44–47, 17 figs. Results of experimental investigation begun two years ago and still in progress; account of tests carried out in ammonia works of Dr. Wyszomirsky in Merseburg. Contains appendix, giving supplementary test regulations for boiler plate.

Testing. The Testing of Boiler Plates, Chas. L. Huston. Power, vol. 59, no. 21, May 20, 1924, pp. 820–822, 3 figs. Proposed revival of Tetmajer formula for using unit stresses instead of factor of safety in determining allowable stresses on steel boiler plate in construction of steam boilers and other pressure vessels.

BOILER ROOMS

Operation. Boiler-Room Practice, J. Bruce. Elec. Rev., vol. 94, nos. 2414 and 2415, Feb. 29 and Mar. 7, 1924, pp. 324–325 and 365–367, 3 figs. Use of boiler-room instruments for efficient operation.

BOILERMAKING

Babcock & Wilcox Plant, France. The French Babcock and Wilcox Boiler Works, G. L. Carden. Boiler Maker, vol. 24, no. 4, Apr. 1924, pp. 95–98, 4 figs. Description of plant located at La Courneuve on northern outskirts of Paris.

Standards. Standards Adopted by the American Boiler Manufacturers' Association. Boiler Maker, vol. 24, no. 4, Apr. 1924, pp. 107–109 and 123–124. Report presented at meeting of Am. Boiler Mfrs.' Assn.

BOILERS

Development. An Outline of Boiler Development, H. Webster. Refrig. Eng., vol. 10, no. 10, Apr. 1924, pp. 367–369. Considers briefly multiplicity of fuels available for steam generation, great number of methods of burning such fuels which have been developed, and the various feedwater conditions that have been encountered, and outline of development of boiler.

Feeding Arrangements. Important Factors in Boiler Feeding, Chas. F. Wade. Power Engr., vol. 19, no. 217, Apr. 1924, pp. 136–137, 1 fig. Aspects of boiler-feeding arrangements which are often overlooked.

Locomotive. See LOCOMOTIVE BOILERS.

Mercury. See MERCURY-VAPOR PROCESS.

Scale-Removal Apparatus. Apparatus for the Prevention of Boiler Scale. Engineering, vol. 117, no. 3045, May 9, 1924, p. 623, 4 figs. Apparatus exhibited at Brit. Empire Exhibition consists of cast-iron cylinder within which perforated cylinder is placed which is filled with ordinary linseed and small amount of common soda.

Settings. Construction of Boiler Settings in Devon Station (Conn.). Power, vol. 59, no. 20, May 13, 1924, pp. 763–765, 6 figs. Furnace walls for 16,800-sq. ft. boilers constructed entirely of firebrick; arches built in walls to relieve loading on brick; expansion joints filled with asbestos fiber divide walls into vertical sections and allow for horizontal expansion; no heat-insulating bricks are used below lower tube line.

3060 Hp. Boilers at Cleveland Rate 3060 Hp. Power Plant Eng., vol. 28, no. 10, May 15, 1924, pp. 517–524, 8 figs. New boilers in Cleveland Elec. Illuminating Co. plant have 30,592-sq. ft. heating surface requiring 8 mi. of tubes; fired by pulverized coal; automatic-combustion control by steam pressure and flowmeters.

Waste-Heat. Waste Heat from Internal-Combustion Engines. Power Engr., vol. 19, no. 218, May 1924, pp. 176–177, 3 figs. Describes Clarkson boiler which is said to be well suited to small engines; its application to semi-Diesel engine.

BORING MACHINES

Large Electrical Machinery. Giant Boring Mill Built in Canada. Iron Age, vol. 113, no. 21, May 22, 1924, pp. 1508–1510, 7 figs. Machine of unusual size for use in manufacture of electrical generating equipment; massive design and convenient control.

BRASS

Constitution. The Constitution of Brass (Zur Konstitution des Messings), G. Masing. Zeit. für Metallkunde, vol. 16, no. 3, Mar. 1924, pp. 96–98, 9 figs. partly on supp. plate. Points out that β-brass is formed below 470 deg. cent. through diffusion and is therefore constant at lower temperatures; the Carpenter diagram of state, it is claimed, does not hold true.

Lead and Tin, Influence of. Lead and Tin in Brass (Blei und Zinn im Messing Ms 60), K. Hanser. Zeit. für Metallkunde, vol. 16, no. 3, Mar. 1924, pp. 91–95, 7 figs. Based on existing investigations and author's own tests, influence of lead and tin on strength, elongation, shrinkage, hardness, and hot and cold working of 60/40 brass is shown.

C

CABLEWAYS

Types. Cableways (Drahtseilbahnen), Fr. Wernekke. Praktische Maschinen-Konstrukteur, vol. 57, no. 8, Mar. 1, 1924, pp. 79–81, 4 figs. Development of transportation on wire rope is discussed and a few successful installations described, both for passenger and material haulage.

CALORIMETERS

Measuring Small Heat Intensities. Measurement of Small Heat Intensities: Use of Compensating Microcalorimeter (Mesure des intensités des petites sources de chaleur: emploi d'un microcalorimètre à compensation), A. Tian. Académie des Sciences—Comptes Rendus, vol. 178, no. 8, Feb. 18, 1924, pp. 705–707. Thermally insulated vessel immersed in bath at constant temperature serves as calorimeter; temperature differences between bath and vessel are measured using thermopile and galvanometer.

CALORIMETRY

Saturated Fluids. Calorimetry of Saturated Fluids, N. S. Osborne. Optical Soc. Am.—Jl., vol. 8, no. 4, Apr. 1924, pp. 519–540. Deals with theory of certain calorimetric processes for determination of important thermal properties of saturated fluids, and with interpretation of theory as bearing upon its experimental application.

CARS

Bearings. See BEARINGS, Anti-Friction.

Cast-Steel Castings, Reclamation by Arc Welding. Reclamation of Cast Steel Car Castings by Arc Welding, H. R. Pennington. Am. Welding Soc.—Jl., vol. 3, no. 4, Apr. 1924, pp. 28–35, 6 figs. Examples of potential savings in reclamation of such parts as coupler bodies, knuckles, truck sides and bolsters for railways, and practice for reclamation of such parts.

Construction Methods. Railway Carriage and Wagon Building. Machy. (Lond.), vol. 24, no. 601, Apr. 3, 1924, pp. 1–4, 5 figs. Practice of Cammell Laird & Co.; making buffer forgings—upsetting forging machines; buffer forging operations.

CARS, FREIGHT

Box. Single Sheathed Box Cars for the D. T. & I. Ry. Mech. Engr., vol. 98, no. 5, May 1924, pp. 279–281, 4 figs. U. S. Railroad Administration design modified to provide 1 ft. added height and 1 ft. wider door opening.

Construction. Production Methods in British Freight Car Building, D. R. Lamb. Ry. Rev., vol. 74, no. 16, Apr. 19, 1924, pp. 717–722, 10 figs. Consecutive operations in erection of 12-ton open freight cars at Derby, Eng., shops of Lond. Midland & Scottish Ry.

CARS, PASSENGER

British Empire Exhibition. British Empire Exhibition Railway Material. Engineering, vol. 117, no. 3045, May 9, 1924, pp. 595–601, 13 figs. Describes exhibits of Birmingham Railway Carriage & Wagon Co., consisting of five passenger, including two pullman cars, and electric locomotives built by Metropolitan-Vickers Elec. Co.

CARS, REFRIGERATOR

Improved Design. New Refrigerator Cars for the Rock Island. Ry. Mech. Engr., vol. 98, no. 5, May 1924, pp. 286–289, 7 figs. Improved side construction has reduced maintenance costs and improved refrigerating efficiency; new method of insulation; Acme ventilation system used.

Insulation. Economical Thickness of Insulation in Refrigerator Cars, A. J. Wood and P. X. Rice. Refrig. Eng., vol. 10, no. 10, Apr. 1924, pp. 357–362 and (discussion) 362–366, 10 figs. Explains a reasonably simple method for determining quickly and accurately most economical thickness of insulation, and discusses factors which enter into economical design of insulated walls.

CARS, STEEL

Scrapping. Electric Arc Process for Scrapping Steel Cars, A. M. Candy. Ry. Elec. Engr., vol. 15, no. 4, Apr. 1924, pp. 112–114, 5 figs. This method less expensive than others where large number of cars is to be handled. Operating data.

CASE-HARDENING

Liquid Baths. A Few Notes on the Shimer Case Hardening Process, B. F. Shepherd. Am. Soc. Steel Treating—Trans., vol. 5, no. 5, May 1924, pp. 485–489 and (discussion) 489–490, 9 figs. Notes on liquid case carburizing of certain steels; curves and photomicrographs showing depths of penetration and structures obtained on S.A.E. 6120 and S.A.E. 1112 steels.

CAST IRON

Graphitization. Notes Properties of Cast Iron, E. Touceda. Foundry, vol. 52, no. 9, May 1, 1924, pp. 345–347, 1 fig. Manner and conditions under which graphitization takes place in cast iron has profound influence upon chemical and physical properties of metal; describes special metal made by Ross-Meehan Foundries, Chattanooga, Tenn., called "mechanite metal." See also Iron Trade Rev., vol. 74, no. 19, May 8, 1924, pp. 1244–1246, 1 fig.

High-Temperature Growth. High-Temperature Growth of Special Cast Irons, J. H. Andrew and H. Hyman. Iron & Steel Inst.—advance paper, no. 2, for mtg. May 1924, 10 pp., 11 figs. Investigation to ascertain whether presence of silicon is necessary factor for growth; what exactly happens to graphite at end of 50 heats; and whether growth can be mitigated or retarded by presence of certain special elements, especially carbide-forming elements, such as chromium and vanadium in small quantities.

Manufacture. The Influence of Composition and Rate of Cooling upon the Microstructure and Physical Properties of Cast Iron, H. H. Beeny. Foundry Trade Jl., vol. 29, nos. 401 and 402, Apr. 24 and May 1, 1924, pp. 333–340 and (discussion) 365–366, 24 figs. Deals with constitution and physical properties of iron-carbon alloys as a whole, commencing with pure iron, passing through steels, and ending finally with white cast iron; microstructure of each broad type illustrated. Iron-carbide system, and influence of silicon and other elements, and rates of cooling upon this system.

Pearlitic. Pearlitic Cast Iron (Perlitguss), K. Emmel. Stahl u. Eisen, vol. 44, no. 13, Mar. 27, 1924, pp. 330–333, 11 figs. Analysis of tests, structure of pistonring castings; discussion based on article by O. Bauer in same journal (vol. 43, 1923, no. 17, p. 553).

Physical Changes. Physical Changes in Cast Iron due to (i) American Practice; (ii) Secondary Temperatures. Metal Industry (Lond.), vol. 24, no. 10, Mar. 7, 1924, pp. 227–228, 5 figs. Discusses influence of casting into chill pig molds and water spraying, as in American blast-furnace practice, and influence of secondary or foundry temperatures, that is, remelting iron and subsequent casting.

Test Bars, Transverse. Transverse Test-Bars and Engineering Formulae, G. S. Bell and C. H. Adamson. Iron & Steel Inst.—advance paper, no. 4, for mtg. May 1924, 15 pp., 11 figs. Test results show that generally accepted engineering formulas for conversion of transverse test on one sized bar to that on another sized bar do not hold when applied to cast-iron test bars of different sizes; results of tensile and hardness tests.

CASTINGS

Automobile, Cleaning. Cleaning Automobile Castings, B. K. Price. Foundry, vol. 52, no. 9, May 1, 1924, pp. 355–357, 7 figs. Methods employed at Brunswick, N. J., plant of Int. Motors Co.; after tumbling and sand blasting, castings are sent to grinding department; plant makes aluminum crankcases.

Light. Some Problems in Light Castings, J. C. Dorsie. Foundry Trade Jl., vol. 29, no. 399, Apr. 10, 1924, pp. 299–300, 4 figs. Designing covers for roadway manholes; warping of gutters; behavior of metal in molds.

CENTRAL STATIONS

Boiler-Feedwater Circuits. Boiler Feed-Water Circuits in Power Stations, J. G. Weir. Ingenieur, vol. 39, no. 18, May 3, 1924, pp. 332–338 and (discussion) 338–339, 18 figs. Importance of use of regenerative principles is emphasized and a number of possible circuits are described, illustrated and analyzed. (In English.)

Brooklyn Edison, Hudson Ave. Hudson Avenue Station. Elec. World, vol. 83, no. 18, May 3, 1924, pp. 867–876, 13 figs. Unusual features incorporated in design of new 400,000-kw. power house of Brooklyn Edison Co.; vertical-phase isolation used; details of coal-handling facilities, heat-balance arrangements, boilers and stokers, fans and feed pumps, turbines (which are largest in world), signaling system, etc.

Hudson Ave. Plant in Operation. Power Plant Eng., vol. 28, no. 10, May 15, 1924, pp. 549–553, 12 figs. Superpower station embodies refinement in heat balance, electric equipment and mechanical control; first section comprises two 50,000-kw. turbines and 8 boilers each with 19,650 sq. ft. heating surface; condensers with 70,000 sq. ft. cooling surface. See also description in Power, vol. 59, no. 20, May 13, 1924, pp. 750–758, 14 figs.

Calcutta, India. The Calcutta Electricity Supply Undertaking, W. Twinch. Elec. Rev., vol. 94, no. 2422, Apr. 25, 1924, pp. 659–663, 10 figs. Description of Cossipore electricity generating; present output is 57,500 kw., and pressure of generation is 6000 volts.

Combustion Control, Centralized. Centralized Combustion Control in Lowellville, Jos. F. Shadgen. Power, vol. 59, no. 18, Apr. 29, 1924, pp. 676–679, 2 figs. One of first complete remote-machine-regulated combustion systems in large power plants; fuel efficiency main object; pneumatic dispatch system of master controller and individual regulators; novel central-control house with unique instrument board.

Construction Methods. Construction Procedure for a Steam Power Station. Eng. News-Rec., vol. 92, no. 18, May 1, 1924, pp. 754–757, 7 figs. Connecticut Light & Power completes 75,000-kva. unit at Devon; concreting continued through winter; many parts fabricated in field shops.

Delaware Station, Philadelphia. Operating Features at Delaware. Power Plant Eng., vol. 28, no. 10, May 15, 1924, pp. 537–542, 8 figs. Among interesting features of large central station in Philadelphia are test boilers, emergency valve control and dual-drive circulating pumps.

Developments. Development and Progress of Central Station Engineering, B. Sankey. S. African Inst. Elec. Engrs.—Trans., vol. 15, Pt. 2, Feb. 1924, pp. 326–334 and (discussion) 334–338, 3 figs. Latest developments in steam-power generation, including high temperatures, high pressures, and air heating, binary fluid turbines, Mulungushi hydroelectric scheme, etc.

Diesel-Engined. Converting a Loser into Profit-Making Plant. Power, vol. 59, no. 20, May 13, 1924, pp. 772–775, 6 figs. Central station at Caruthersville, Mo., supplying both electricity and ice, cut its generating cost from over 6 to less than 1 per cent per kw-hr. by replacing an obsolete steam plant with Diesel engines; waste-heat recovery is employed in nearby house-heating service.

Paper Mills, Kalamazoo. New Power Plant of the Bryant Paper Co. Power, vol. 59, no. 19, May 6, 1924, pp. 710–715, 6 figs. Central plant of 8000-kw. ultimate capacity, designed to supply power, steam and hot water to four divisions of large paper mill in Kalamazoo, Mich., replaces combination of individual boiler plants and scattered engine units; special features are balancing of power and heating steam, special coal and ash handling, automatic control and complete metering facilities.

Reheating in. Reheating in Central Stations, W. J. Wohlenberg. Mech. Eng., vol. 46, no. 5, May 1924, pp. 259–262, 11 figs. Influence of amounts of energy added in reheating, number of reheating stages,

Manufactured by Advertisers — CLASSIFIED LIST OF MECHANICAL EQUIPMENT — Alphabetical List on page 152

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New York Blue Print Paper Co
ParVell Laboratories
U. S. Blue Co.
Weber, F. Co. (Inc.)

Dredges, Hydraulic
* Morris Machine Works

Dredging Machinery
Lidgerwood Mfg. Co.
* Morris Machine Works

Dredging Sleeve
* United States Rubber Co.

Drilling Machines, Sensitive
* Royersford Fdry. & Mach. Co.

Drilling Machines, Vertical
* Royersford Fdry. & Mach. Co.

Drills, Coal and Slate
* General Electric Co.
* Ingersoll-Rand Co.

Drills, Core
* Ingersoll-Rand Co.

Drills, Rock
* General Electric Co.
* Ingersoll-Rand Co.

Drinking Fountains, Sanitary
Johns-Manville (Inc.)
Murdock Mfg. & Supply Co.

Dryers, Coal
Grindle Fuel Equipment Co.

Dryers, Rotary
* Bigelow Co.
Farrel Foundry & Machine Co.
Link-Belt Co.
* Sturtevant, B. F. Co.

Drying Apparatus
* American Blower Co.
* Carrier Engineering Corp'n
* Clarage Fan Co.
* Sturtevant, B. F. Co.

Dust Collecting Systems
* Allington & Curtis Mfg. Co.
* Allis-Chalmers Mfg. Co.
* Clarage Fan Co.
* Sturtevant, B. F. Co.

Dust Collectors
* Allington & Curtis Mfg. Co.
* Allis-Chalmers Mfg. Co.
* Sturtevant, B. F. Co.

Dynamometers
* American Schaeffer & Budenberg Corp'n
* General Electric Co.
* Wheeler, C. H. Mfg. Co.

Economizers, Fuel
* Green Fuel Economizer Co.
* Power Specialty Co.
* Sturtevant, B. F. Co.

Ejectors
* Schutte & Koerting Co.

Electrical Machinery
* Allis-Chalmers Mfg. Co.
* General Electric Co.
* Westinghouse Electric & Mfg. Co.

Electrical Supplies
* General Electric Co.
Johns-Manville (Inc.)

Elevating and Conveying Machinery
* Brown Hoisting Machinery Co.
Chain Belt Co.
* Gifford-Wood Co.
* Jones, W. A. Fdry. & Mach. Co.
Link-Belt Co.
Palmer-Bee Co.

Elevators, Bucket & Chain
Gandy Belting Co.

Elevators, Hydraulic
* Whiting Corp'n

Elevators, Pneumatic
* Whiting Corp'n

Elevators, Portable
* Gifford-Wood Co.
Link-Belt Co.

Elevators, Telescopic
Link-Belt Co.

Emery Wheel Dressers
* Builders Iron Foundry

Engine Repairs
* Franklin Machine Co.
* Nordberg Mfg. Co.

Engine Stops
Golden-Anderson Valve Specialty Co.
* Schutte & Koerting Co.

Engines, Blowing
* Allis-Chalmers Mfg. Co.
Mackintosh-Hemphill Co.
* Nordberg Mfg. Co.
* Worthington Pump & Machinery Corp'n

Engines, Gas
* Allis-Chalmers Mfg. Co.
* De La Vergne Machine Co.
* Ingersoll-Rand Co.
* Titusville Iron Works Co.
* Westinghouse Electric & Mfg. Co.

Engines, Gasoline
* Sturtevant, B. F. Co.
* Titusville Iron Works Co.
* Worthington Pump & Machinery Corp'n

Engines, Hoisting
* Allis-Chalmers Mfg. Co.
Clyde Iron Works Sales Co.
Lidgerwood Mfg. Co.
* Morris Machine Works
* Nordberg Mfg. Co.

Engines, Kerosene
* Worthington Pump & Machinery Corp'n

Engines, Marine
Bethlehem Shipbldg.Corp'n(Ltd.)
* Ingersoll-Rand Co.
Johnson, Carlyle Machine Co.
* Nordberg Mfg. Co.
* Sturtevant, B. F. Co.
* Ward, Chas. Engineering Works
* Worthington Pump & Machinery Corp'n

Engines, Marine, Oil
Bethlehem Shipbldg.Corp'n(Ltd.)
* Ingersoll-Rand Co.
* Nordberg Mfg. Co.

Engines, Marine, Steam
Bethlehem Shipbldg.Corp'n(Ltd.)
* Nordberg Mfg. Co.

Engines, Oil
* Allis-Chalmers Mfg. Co.
Bethlehem Shipbldg.Corp'n(Ltd.)
* De La Vergne Machine Co.
* Ingersoll-Rand Co.
* Nordberg Mfg. Co
* Titusville Iron Works Co.
* Worthington Pump & Machinery Corp'n

Engines, Oil, Diesel
* Allis-Chalmers Mfg. Co.
Bethlehem Shipbldg.Corp'n(Ltd.)
* Nordberg Mfg. Co.
* Worthington Pump & Machinery Corp'n

Engines, Pumping
* Allis-Chalmers Mfg. Co.
* Ingersoll-Rand Co.
* Morris Machine Works
* Nordberg Mfg. Co.
* Worthington Pump & Machinery Corp'n

Engines, Steam
* Allis-Chalmers Mfg. Co.
* American Blower Co.
Bethlehem Shipbldg.Corp'n(Ltd.)
* Clarage Fan Co.
Clyde Iron Works Sales Co.
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* Leffel, James & Co.
Lidgerwood Mfg. Co.
Mackintosh-Hemphill Co.
* Morris Machine Works
* Nordberg Mfg. Co.
Ridgway Dynamo & Engine Co.
* Skinner Engine Co.
* Sturtevant, B. F. Co.
* Titusville Iron Works Co.
* Troy Engine & Machine Co.
* Vilter Mfg. Co.
* Westinghouse Electric & Mfg. Co.
* Wheeler, C. H. Mfg. Co.

Engines, Steam, Automatic
* American Blower Co.
* Clarage Fan Co.
* Engberg's Electric & Mech. Wks.
* Erie City Iron Works
* Harrisburg Fdry. & Mach. Wks
* Leffel, James & Co.
Ridgway Dynamo & Engine Co.
* Skinner Engine Co.
* Sturtevant, B. F. Co
* Troy Engine & Machine Co.
* Westinghouse Electric & Mfg. Co.

*Catalogue data of firms marked * appear in the A.S.M.E. Condensed Catalogues of Mechanical Equipment. 1923-24 Volume*

and points in expansion at which reheating should begin; comparison of reheating, regenerative, and combination cycles combining both reheating and bleeding stages; shows that, because of influence on internal machine efficiency thereby, reheating properly applied may lead to higher efficiencies than bleeding; also that combination cycles give promise of realization in practice of appreciably higher efficiencies than would be case for other cycles investigated. Abridged.

Units in Parallel, Efficiency of. Maximum Operating Efficiency of Power Units in Parallel, A. P. Strom. Nat. Engr., vol. 28, no. 5, May 1924, pp. 210–212, 2 figs. Water rates of individual units plotted on a combined chart showing total water rate for any combination of units for various loads; most efficient combination of units can at once be determined by reference to chart. Serves equally well for distribution of load in hydroelectric plants.

Williamsport, Md. A 14,000-Kw. Station at Williamsport (Md.), Quickly Designed and Built. Power, vol. 59, no. 10, Mar. 4, 1924, pp. 354–360, 10 figs. Ultimate capacity is 160,000 kw.; economizers and stage bleeders are used; 325 lb. steam pressure; design and erection completed one year after site was purchased, with 3,990,500 kw-hr. generated; other features of Potomac Edison Co.'s station; tabular list of mechanical equipment.

CHAIN DRIVE

Efficiency. The Efficiency of Chains as a Power Transmitting Agent. H. Seymour. Elec. Rev., vol. 94, no. 2418, Mar. 28, 1924, pp. 484–486, 5 figs. Advantages of chain drive; suggestions for efficiency operation.

CHAINS

Malleable-Iron. Malleable Iron Chain, J. W. Cardom. Foundry Trade Jl., vol. 29, no. 398, Apr. 3, 1924, pp. 269–272, 8 figs. Description of manufacturing methods, including molding and annealing, and metallurgical considerations. See also discussion in no. 399, Apr. 3, 1924, pp. 301–304.

CHIMNEYS

Calculation. The Calculation of Chimneys (Le Calcul des Cheminées), A. Grebel. Chaleur & Industries, vol. 5, no. 45, Jan. 1924, pp. 13–22, 8 figs. Method developed by author, extracted from work entitled, Gas & Coke, by Gerbel and Bouron.

CLUTCHES

Electrically Operated. Electrically-Operated Clutches, M. H. Sabine. Machy. (Lond.), vol. 24, no. 602, Apr. 10, 1924, pp. 44–45, 7 figs. Improved design of solenoid clutch for use where control of power unit from distant position is required.

Friction. Considerations in Friction Clutch Design, A. Clegg. Machy. (N. Y.), vol. 30, no. 9, May 1924, p. 669–670. Factors involved in design; allowable bearing pressures; calculating horsepower; types of friction clutches; single-plate, coil, and double-plate clutches.

COAL

Anthracite, Ash Content of. Ash in Anthracite, O. P. Hood. U. S. Bur. Mines, Reports of Investigations, No. 2571, Feb. 1924, 2 pp. Results of tests made by Bur. of Mines on 127 samples of 1000 lb. each, representing nearly 30,000 tons of anthracite in dealers' yards in 17 cities in State of Massachusetts.

Classification. Contribution to the Classification of Coal with Special Reference to Its Coking Qualities (Bidrag til klassifikationen av stenkol med särskild hänsyn tagen till deras koksningsförmåga), S. Qvarfort. Teknisk Tidskrift, vol. 54, no. 15, Apr. 12, 1924, pp. 25–30 (Kemi), 15 figs. Method for testing coking qualities of a coal sample is described and, on basis of test, coal is classified as belonging to one of the nine different classes, defined by author. Advantageous use of such tests for gas works.

Oxidation. Silver-sulphochromic Oxidation of Coal (Oxydation argento-sulfochromique de la houille), L. J. Simon. Académie des Sciences—Comptes Rendus, vol. 178, no. 9, Feb. 25, 1924, pp. 775–777. When coal is heated with mixture of silver bichromate and concentrated sulphuric acid at 100 deg., 4 to 5 per cent of carbon present remains unoxidized; formation of gaseous oxidation products is more rapid at 50 than at 60 deg., at which temperature 28 per cent of coal remains unchanged; it is concluded that coal contains two constituents intimately mixed; one is oxidized at low temperatures, other, like coke, requires temperature of 100 per cent.

Pulverized. See PULVERIZED COAL.

Volatile Matter and Ash Content. The Volatile Matter and Ash Contents of Samples of Coal from the Same Seam, T. J. Drakeley and J. R. I. Hepburn. Chem. & Industry, vol. 43, no. 18, May 2, 1924, pp. 134T-137T. Gives equation for calculating, on average samples of dry coal containing no iron pyrites, volatile-matter content of coal on ash-free basis; percentage of volatile matter yielded by dry shale appears to vary considerably; variations may be due to different methods employed in initial drying of shale; modified equations for calculating volatile-matter content of coal on ash-free bases, for crude-coal samples containing iron pyrites, etc.

COAL HANDLING

Boiler Plants. Coal Handling in Small Boiler Plants. Power Engr., vol. 19, no. 218, May 1924, pp. 171–172, 4 figs. Notes concerning plant with but one or two boilers.

Ropeway System. Ropeway for Coaling a London Hotel, G. F. Zimmer. Indus. Mgt. (Lond.), vol. 11, no. 9, May 1, 1924, pp. 243–245 and 249, 6 figs. Description of ropeway which brings coal to store or stoke hole of Hotel Cecil; is of standard bi-cable type; total length from center feeding to center delivery terminal 230 ft.; two rail ropes ¾ in. in diam.; 3-hp. motor operates ¼-in.-diam. hauling rope at speed of 25 ft. per min. at feeding terminal.

COAL STORAGE

Economy. Economic Phases of Coal Storage, F. G. Tryon and W. F. McKenney. Universal Engr., vol. 39, no. 4, Apr. 1924, pp. 19–25, 2 figs. Extent to which practice of storage has already been adopted; inducements to store offered by periodic fluctuations in price and supply of coal.

COKE HANDLING

Hoists for. Automatic Coke Hoist, D. Cleave Cross. Gas Wld., vol. 80, no. 2071, Mar. 29, 1924, pp. 292–293, 2 figs. Describes a somewhat novel coke hoist erected at Lea Bridge gas works for use with water-gas plant. Paper read before Lond. & Southern District Jr. Gas Assn.

COMPRESSED AIR

Improved Practice, Possibilities of. Possibilities of Improvement in Compressed-Air Practice Verbesserungsmöglichkeiten im Druckluftbetriebe), A. Hinz. Glückauf, vol. 60, nos. 15 and 16, Apr. 12 and 19, 1924, pp. 279–284 and 304–308, 2 figs. After brief discussion of costs of compressed-air operation, author investigates whether economy can be increased through improvements of compressor and motors; no advantages are obtained from higher air pressure, as work with lower pressures is more economical; great advantages result from utilization of air expansion which is only possible with minimum water content of compressed air, due to danger of freezing.

Measurement. A New Compressed-Air Measuring Method (Ein neues Druckluft-Messverfahren), E. Stach. Glückauf, vol. 60, no. 14, Apr. 5, 1924, pp. 260–262, 3 figs. New method for and equipment determining compressed-air consumption in relation to suction volume in a pipe line or a machine; pressure fluctuations are without influence on measurement results.

CONDENSERS, STEAM

Air Cooling, Effect on. How External Air Cooling Increases the Effectiveness of Condenser-Tube Surface, P. Bancel. Power, vol. 59, no. 20, May 13, 1924, pp. 769–771, 4 figs. Points out that two distinct processes ordinarily occur inside of surface condensers, namely, steam condensing, which goes on at high rate of heat transfer, and devaporizing air-steam mixture, which is carried out at very low rate of heat transfer; when air coolers are provided outside of condenser to handle latter process, condenser tubes may operate at much higher efficiency.

Barometric, Vacuum-Pump Capacity. Calculating the Amount of Air Liberated in Barometric Condensers, C. M. Reed. Power, vol. 59, no. 10, Mar. 4, 1924, pp. 370–372, 4 figs. Air enters with cooling water, steam and by leakage, which may be easily calculated from charts.

Ejector-Air. Ejector-Air Condenser (L'Ejecteau-Air Condenseur). Génie Civil, vol. 84, no. 10, Mar. 8, 1924, pp. 234–235, 6 figs. Describes apparatus and principle upon which it is based; output depends solely upon speed of steam transmission in apparatus, and is expressed in function of ratio of weight of steam to cross-section of ejector inlet.

Surface. Tendencies in Surface Condenser Practice. Power Plant Eng., vol. 28, no. 10, May 15, 1924, pp. 530–533, 4 figs. Points out that elimination of dead tube space, multiple air-suction openings and variable water supply are important factors in condenser design and application.

Surface, Heat Transmission in. Transmission of Heat in Surface Condensers According to Nusselt's Theory (La trasmissione del calore nei condensatori a superficie secondo la teoria del Nusselt), M. Medici. Industria, vol. 38, nos. 2, 4 and 6, Jan. 31, Feb. 29 and Mar. 31, 1924, pp. 40–43, 100–103 and 163–165, 4 figs. Extended mathematical treatment of subject.

Test Code. Test Code for Condensing Apparatus. Mech. Eng., vol. 46, no. 5, May 1924, pp. 291–296. Preliminary draft of additional code in series of nineteen being formulated by A.S.M.E. Committee on Power Test Codes.

Types. The Control of Power Production, Chas. L. Hubbard. Factory, vol. 32, no. 3, Mar. 1924, pp. 312–316 and 366, 19 figs. Condensers and their equipment.

CONNECTING RODS

Locomotive, Repair. Repairing Locomotive Main and Side Rods, Chas. F. Henry. Am. Mach., vol. 60, no. 20, May 15, 1924, pp. 731–732, 10 figs. Detailed information concerning methods in use on Santa Fé system for reclaiming broken and worn connecting rods to fit them for further service.

CONVEYORS

Cotton-Mill. Conveyors Require Good Management, Robt. T. Kent. Mgt. & Administration, vol. 7, no. 5, May 1924, pp. 539–543. Mechanical handling in cotton mill improved production, increased wages, lowered costs, and lessened labor troubles; methods employed at Jackson Mills at Nashua, N. H.

Medium-Sized Shops. Increasing Production by Power Conveyors, Chas. O. Herb. Machy. (N. Y.), vol. 30, no. 9, May 1924, pp. 706–709, 5 figs. Conveyor installations that have proved their economy in plant manufacturing small parts; japanning conveyors; conveyors for cleaning work before nickel-plating, and rinsing and drying afterward; assembly conveyors.

Shaking. Shaking Conveyors and the Marcus Acceleration Process (Die Schüttelrutschenförderung und das Beschleunigungsverfahren von Marcus), O. Ohnesorge. Fördertechnik u. Frachtverkehr, vol. 17, no. 6, Mar. 20, 1924, pp. 71–76, 8 figs. Mechanical basic conditions of oscillating troughs in general and the Marcus trough in particular; shaking-chute conveyance in inclined path purely as gravity conveyance; drive of shaking conveyors.

[See also ASH HANDLING.]

COST ACCOUNTING

Capital Control. Capital Requirements and Control, J. H. Bliss. Mgt. & Administration, vol. 7, no. 5, May 1924, pp. 529–532. Surplus and its constructive application.

Point Method. Getting at Costs by the "Point Method," R. E. Roesler. Factory, vol. 32, no. 5, May 1924, pp. 662–663, 2 figs. Describes point cost method and its applications.

CRANES

Electric Current for, Choice of. Choice of Current for Hoists with Special Regard to Harbor Cranes (Wahl der Stromart für Hebezeuge unter besonderer Berücksichtigung der Hafenkrane), H. Gettert. Elektrotechnische Zeit., vol. 45, no. 16, Apr. 17, 1924, pp. 353–359, 17 figs. Author seeks to ascertain which kind of current is most economical with regard to energy consumption.

Electric Equipment. Modern Single-Phase Crane Equipment of Brown, Boveri & Cie (Moderne Einphasen-Kran-Ausrüstungen der Brown, Boveri & Cie., A.-G.), H. Gettert. Fördertechnik u. Frachtverkehr, vol. 17, no. 5, Mar. 3, 1924, pp. 59–65, 28 figs. Advantages of Deri motors for drive of hoists; design and operation of motors; selection of control apparatus and arrangement of control for different types of cranes; notes on the control of Deri motors with controller and resistance.

Harbor. Improvements in the Construction of German Loading and Unloading Equipment (Neuerungen im Bau von deutscher Umschlaganlagen), Buhle. Bautechnik, vol. 2, no. 12, Mar. 18, 1924, pp. 125–142, 61 figs. Deals with mechanical equipment for ship loading and unloading, giving numerous examples of modern harbor cranes, and auxiliary equipment.

CUPOLAS

Tilting Device. Tilting Device Has Advantages on Small Cupola. Can. Foundryman, vol. 15, no. 3, Mar. 1924, p. 16, 1 fig. Shell hung on trunions for convenience in preparing instead of workman getting inside.

D

DIES

Drawing, Design of. Designing Drawing Dies, E. Heller. Machy. (N. Y.), vol. 30, no. 9, May 1924, pp. 687–691, 7 figs. Problems encountered in determining size of blank necessary to produce shell of given dimensions and number of drawing operations required to complete work.

DIESEL ENGINES

Beardmore-Tosi, Machining. Building Marine Diesel Engines. Machy. (Lond.), vols. 23 and 24, nos. 600 and 601, Mar. 27 and Apr. 3, 1924, pp. 825–828 and 17–21, 25 figs. Machining operations on Beardmore-Tosi Engine.

Bethlehem. Types of Modern Power-Plant Oil Engines. Oil Engine Power, vol. 2, no. 3, Mar. 1924, pp. 152–156 and 161, 8 figs. Critique of design features of Bethlehem 2900-b.hp. 2-cycle unit, and complete details relating to design and method of operation of its axial scavenging valve.

Experiments. Further Experimental Work on Diesel Engines, R. Beeman. Shipbldg. & Shipg. Rec., vol. 23, no. 16, Apr. 17, 1924, pp. 459–461. Describes some further experimental work, dealing with Diesels for warships, dimensions and weight, aluminum alloy pistons, development of high mean pressures, determination of suitable profile for fuel cam actuating sprayer, shaping of combustion chamber, rate of heat flow and its attendant stresses, lubricating oil consumption, and alternative fuels. Abstract of paper read before Instn. Naval Architects.

Four-Cycle, Supercharging of. Will Supercharging Revolutionize Four-Cycle Diesel Operation? Oil Engine Power, vol. 2, no. 3, Mar. 1924, pp. 148–152, 8 figs. Supercharging development work in Germany and America in connection with four-cycle Diesel engines.

Lubrication. Lubricating Diesel Engines and Auxiliary Machinery. Mar. Eng., vol. 29, no. 5, May 1924, pp. 298–300. General rules for selecting lubricants and methods of applying them to promote economy.

The Lubrication of Diesel Engines (Ueber Dieselmaschinen-Schmierfragen), W. Ernst. Zeit. des Vereines deutscher Ingenieure, vol. 68, no. 18, May 3, 1924, pp. 451–454, 14 figs. Points out that in view of the different parts to be lubricated, use of different oils for various applications is desirable, but it is sometimes necessary to use a unit lubricating oil which has to be adapted to the various applications including that of cooling pistons; gives examples of difficulties encountered in lubrication of Diesel engines with a unit oil.

Marine. Latest Developments in Diesel-Engine Ship Propulsion (Neueste Bestrebungen beim Schiffsantrieb durch Dieselmotoren), E. Goos. Zeit. des Vereines deutscher Ingenieure, vol. 68, no. 18, May 3, 1924, pp. 435–441, 18 figs. Discusses present tendencies in development of marine Diesel engines; examples and practical results; measures for increasing efficiency and improving operating safety and economy; drive of auxiliary machinery; heating and motor oils.

Michel. The Michel Engine (Der Michel-Motor). Motor u. Auto, vol. 21, no. 5, May 10, 1924, pp. 40–41, 4 figs. Two-stroke-cycle Diesel engine with new arrangement for transmission of piston force; small engines requiring little space; good balancing of masses.

Nordberg. Types of Modern Power-Plant Oil Engines. Oil Engine Power, vol. 11, no. 4, Apr. 1924,

Manufactured by Advertisers

CLASSIFIED LIST OF MECHANICAL EQUIPMENT

Alphabetical List on page 152

Engines, Steam, Corliss
* Allis-Chalmers Mfg. Co.
* Franklin Machine Co.
* Frick Co. (Inc.)
* Harrisburg Fdry. & Mach. Wks.
Mackintosh-Hemphill Co.
* Nordberg Mfg. Co.
* Vilter Mfg. Co.

Engines, Steam, High Speed
* American Blower Co.
* Clarage Fan Co.
* Engberg's Electric & Mech. Wks.
* Erie City Iron Works
* Harrisburg Fdry. & Mach. Wks.
* Nordberg Mfg. Co
Ridgway Dynamo & Engine Co.
* Skinner Engine Co.

Engines, Steam, Poppet Valve
* Erie City Iron Works
* Nordberg Mfg. Co.
Ridgway Dynamo & Engine Co.
* Vilter Mfg. Co.

Engines, Steam, Throttling
* American Blower Co.
* Clarage Fan Co.
* Engberg's Electric & Mech. Wks.
Ridgway Dynamo & Engine Co.

Engines, Steam, Una-Flow
* Frick Co. (Inc.)
* Harrisburg Fdry. & Mach. Wks.
* Nordberg Mfg. Co.
Ridgway Dynamo & Engine Co.
* Skinner Engine Co.

Engines, Steam, Variable Speed
* American Blower Co.
* Harrisburg Fdry. & Mach. Wks.
* Nordberg Mfg. Co.
Ridgway Dynamo & Engine Co.

Engines, Steam, Vertical (Fully Enclosed, Self-Oiling)
* American Blower Co.
* Clarage Fan Co.
* Engberg's Electric & Mech. Wks.
* Troy Engine & Machine Co.

Engines, Steering
Bethlehem Shipbldg.Corp'n(Ltd.)
Lidgerwood Mfg. Co.

Evaporators
Bethlehem Shipbldg.Corp'n(Ltd.)
* Croll-Reynolds Engrg. Co. (Inc.)
Farrel Foundry & Machine Co.
* Vogt, Henry Machine Co.
* Wheeler Condenser & Engrg. Co.

Excavating Machinery
Clyde Iron Works Sales Co.
Lidgerwood Mfg. Co.
Link-Belt Co.

Exhaust Heads
Hoppes Mfg. Co.

Exhaust Systems
* Allington & Curtis Mfg. Co.
* American Blower Co.
* Clarage Fan Co.
* Sturtevant, B. F. Co.

Exhausters, Gas
* American Blower Co.
* Clarage Fan Co.
Fletcher Works
* General Electric Co.
* Green Fuel Economizer Co.
* Schutte & Koerting Co.
* Sturtevant, B. F. Co.

Extractors, Centrifugal
Fletcher Works
Tolhurst Machine Works

Extractors, Oil and Grease
* American Schaeffer & Budenberg Corp'n
* Kieley & Mueller (Inc.)

Fans, Exhaust
* American Blower Co.
* Clarage Fan Co.
* Coppus Engineering Corp'n
* General Electric Co.
* Green Fuel Economizer Co
* Sturtevant, B. F. Co.

Fans, Exhaust, Mine
* American Blower Co.
* Sturtevant, B. F. Co.

Feeders, Pulverized Fuel
* Combustion Engineering Corp'n
Grindle Fuel Equipment Co.
* Smidth, F. L. & Co.

Filters, Air
Reed Air Filter Co. (Inc.)

Filters, Feed Water, Boiler
* Permutit Co.

Filters, Feed Water, Demulsifying
* Permutit Co.

Filters, Gravity
* Permutit Co.

Filters, Mechanical
* Permutit Co.

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* Bowser, S. F. & Co. (Inc.)
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* General Electric Co.
* Permutit Co.

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* Graver Corp'n
* Permutit Co.

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Elliott Co.
* Graver Corp'n
* Permutit Co.
* Scaife, Wm. B. & Sons Co.

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* Graver Corp'n
International Filter Co.
* Permutit Co.
* Scaife, Wm. B. & Sons Co.

Fire Brick, Fire Hydrants, etc.
(See Brick, Hydrants, Fire, etc.)

Fittings, Ammonia
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* De La Vergne Machine Co.
* Frick Co. (Inc.)
* Vilter Mfg. Co.
* Vogt, Henry Machine Co.

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Lunkenheimer Co.

Fittings, Flanged
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(Reading Valve & Fittings Div.)
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* Vogt, Henry Machine Co.

Fittings, Hydraulic
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* Pittsburgh Valve, Fdry. & Const. Co.
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* Vogt, Henry Machine Co.

Fittings, Pipe
* Barco Mfg. Co.
Bethlehem Shipbldg.Corp'n(Ltd.)
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* Crane Co.
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Lunkenheimer Co.
* Pittsburgh Valve, Fdry. & Const. Co.
* Reading Steel Casting Co. (Inc.)
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* Vogt, Henry Machine Co.

Fittings, Steel
* Crane Co.
Lunkenheimer Co.
* Pittsburgh Valve, Fdry. & Const. Co.
* Reading Steel Casting Co. (Inc.)
(Reading Valve & Fittings Div.)
Steere Engineering Co.
* Vogt, Henry Machine Co.

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* American Spiral Pipe Works
* Crane Co.
Kennedy Valve Mfg. Co.
Lunkenheimer Co.
* Pittsburgh Valve, Fdry. & Const. Co.
* Reading Steel Casting Co. (Inc.)
(Reading Valve & Fittings Div.)
* Vogt, Henry Machine Co.

Flanges, Forged Steel
Cann & Saul Steel Co.

Floor Armor
* Irving Iron Works Co.

Floor Stands
* Chapman Valve Mfg. Co.
* Crane Co.
Hill Clutch Mach. & Fdry. Co.
* Jones, W. A. Fdry. & Mach. Co.
Kennedy Valve Mfg. Co.
Lunkenheimer Co.
* Pittsburgh Valve, Fdry. & Const. Co.
* Reading Steel Casting Co. (Inc.)
(Pratt & Cady Division)
* Royersford Fdry. & Mach. Co.
* Schutte & Koerting Co.
* Wood's, T. B. Sons Co.

Flooring-Grating
* Irving Iron Works Co.

Flooring, Metallic
* Irving Iron Works Co.

Flooring, Rubber
* United States Rubber Co.

Flour Milling Machinery
* Allis-Chalmers Mfg. Co.

Flue Gas Analysis Apparatus
* Tagliabue, C. J. Mfg. Co.

Fly Wheels
Hill Clutch Machine & Fdry. Co.
* Medart Co.
* Nordberg Mfg. Co.
* Wood's, T. B. Sons Co.

Fonts, Outdoor Bubble
Murdock Mfg. & Supply Co.

Forgings, Drop
* Vogt, Henry Machine Co.

Forgings, Hammered
Cann & Saul Steel Co.

Forgings, Iron and Steel
Cann & Saul Steel Co.

Foundry Equipment
* Whiting Corp'n

Friction Clutches, Hoists, etc.
(See Clutches, Hoists, etc., Friction)

Friction, Paper and Iron
Link-Belt Co.

Fuel Economizers
(See Economizers, Fuel)

Furnace Construction
Furnace Engineering Co.

Furnaces, Annealing and Tempering
* General Electric Co.
* Whiting Corp'n

Furnaces, Boiler
* American Engineering Co.
* American Spiral Pipe Wks.
* Babcock & Wilcox Co.
* Bernitz Furnace Appliance Co.
* Combustion Engineering Corp'n
* Detroit Stoker Co.
* Riley, Sanford Stoker Co.

Furnaces, Down Draft
* O'Brien, John Boiler Works Co.

Furnaces, Electric
Detroit Electric Furnace Co.
* Westinghouse Elect. & Mfg. Co.

Furnaces, Heat Treating
* General Electric Co.

Furnaces, Melting
Detroit Electric Furnace Co.
* General Electric Co.
* Whiting Corp'n

Furnace, Non-Ferrous
Detroit Electric Furnace Co.

Furnaces, Powdered Coal
Grindle Fuel Equipment Co.

Furnaces, Smokeless
* American Engineering Co.
* Babcock & Wilcox Co.
* Combustion Engineering Corp'n
* Detroit Stoker Co.
* Riley, Sanford Stoker Co.

Fuses
* General Electric Co.
Johns-Manville (Inc.)
* Westinghouse Elect. & Mfg. Co.

Gage Boards
* American Schaeffer & Budenberg Corp'n
* Ashton Valve Co.
* Crosby Steam Gage & Valve Co.

Gage Glasses
* American Schaeffer & Budenberg Corp'n

Gage Glasses, Inclined
Sesure Water Gauge Co.

Gage Testers
* American Schaeffer & Budenberg Corp'n
* Ashton Valve Co.
* Crosby Steam Gage & Valve Co.

Gages, Altitudes
* American Schaeffer & Budenberg Corp'n
* Ashton Valve Co.
* Crosby Steam Gage & Valve Co.

Gages, Ammonia
* American Schaeffer & Budenberg Corp'n
* Ashton Valve Co.
* Crosby Steam Gage & Valve Co.
* Vogt, Henry Machine Co.

Gages, Differential Pressure
* American Schaeffer & Budenberg Corp'n
Bacharach Industrial Instrument Co.
* Bailey Meter Co.
* Tagliabue, C. J. Mfg. Co.
* Uehling Instrument Co.

Gages, Draft
* American Schaeffer & Budenberg Corp'n
* Ashton Valve Co.
Bacharach Industrial Instrument Co.
* Bailey Meter Co.
* Bristol Co.
* Tagliabue, C. J. Mfg. Co.
* Taylor Instrument Cos.
* Uehling Instrument Co.

Gages, Hydraulic
* American Schaeffer & Budenberg Corp'n
* Ashton Valve Co.
* Crosby Steam Gage & Valve Co.

Gages, Liquid Level
* Bristol Co.
Lunkenheimer Co.
* Simplex Valve & Meter Co.

Gages, Loss of Head
* Builders Iron Foundry
* Simplex Valve & Meter Co.

Gages, Measuring (Surface, Depth, Dial, etc.)
* Norma Co. of America

Gages, Pressure
* American Schaeffer & Budenberg Corp'n
* Ashton Valve Co.
Bacharach Industrial Instrument Co.
* Bailey Meter Co.
* Bristol Co.
* Crosby Steam Gage & Valve Co.
* Tagliabue, C. J. Mfg. Co.
* Uehling Instrument Co.

Gages, Rate of Flow
Bacharach Industrial Instrument Co.
* Bailey Meter Co.
* Builders Iron Foundry
* Simplex Valve & Meter Co.

Gages, Syphon
* Tagliabue, C. J. Mfg. Co.

Gages, Vacuum
* American Schaeffer & Budenberg Corp'n
* Ashton Valve Co.
Bacharach Industrial Instrument Co.
* Bristol Co.
* Crosby Steam Gage & Valve Co
* Tagliabue, C. J. Mfg. Co.
* Taylor Instrument Cos.
* Uehling Instrument Co.

Gages, Water
* American Schaeffer & Budenberg Corp'n
* Ashton Valve Co.
* Bristol Co.
* Crane Co.
* Jenkins Bros.
Lunkenheimer Co.
* Reading Steel Casting Co. (Inc.)
(Pratt & Cady Division)
* Simplex Valve & Meter Co.

Gages, Water Level
* American Schaeffer & Budenberg Corp'n
* Bristol Co.
Lunkenheimer Co.
* Simplex Valve & Meter Co.

Gas Plant Machinery
* Cole, R. D. Mfg. Co.
Steere Engineering Co.

Gaskets
Garlock Packing Co.
* Jenkins Bros.
Johns-Manville (Inc.)
* Sarco Co. (Inc.)

Gaskets, Iron, Corrugated
Smooth-On Mfg. Co.

Gaskets, Rubber
Garlock Packing Co.
* Goodrich, B. F. Rubber Co.
* United States Rubber Co.

Gates, Blast
* American Blower Co.
Steere Engineering Co.

Gates, Cut-off
Easton Car & Construction Co.
Link-Belt Co.

Gates, Sluice
* Chapman Valve Mfg. Co.
* Pittsburgh Valve, Fdry. & Cons. Co.

Gear Blanks
Cann & Saul Steel Co.

Gear Cutting Machines
* Jones, W. A. Fdry. & Mach. Co.

Gear Hobbing Machines
* Jones, W. A. Fdry. & Mach. Co.

*Catalogue data of firms marked * appear in the A.S.M.E. Condensed Catalogues of Mechanical Equipment. 1923-24 Volume*

pp. 203–209, 12 figs. Describes Nordberg model having a cylinder output of 550 b.hp. at 120 r.p.m.; many 4-cylinder units of 2200 hp. are in service. Operating and installation costs data.

DYNAMOMETERS

Belt. Some Power Studies Through Use of the Ohio Recording Belt Dynamometer, G. W. McCuen. Agricultural Eng., vol. 5, no. 3, Mar. 1924, pp. 51–55, 13 figs. Describes dynamometer that will record power requirements and performance of belt-driven machines; prime mover, in a cradle, swings to make possible recording of a torque due to resistance in a belt. Studies in threshing and baling straw. Tests on effect of sharpness of knives.

E

ELECTRIC FURNACES

Acid. The Manufacture of Acid Electric Steel for Commercial Castings, L. J. Barton. Am. Soc. Steel Treating—Trans., vol. 5, no. 4, Apr. 1924, pp. 369–398, 8 figs. Discusses manufacture of acid as made in electric furnace, for use in production of commercial castings; selection, segregation and use of scrap metal; details of charging melting furnace; melting-down conditions involved, and various types of slags obtained in both good and bad practices; production of special steels and various alloy steels.

Control Gear. An Electric Furnace Regulating Gear, H. J. Seymour. Power Engr., vol. 19, no. 218, May 1924, pp. 174–175, 2 figs. Describes one type of automatic apparatus for regulation of 2-phase electric furnaces.

Developments. Electric Furnace Developments, F. Hodson. Foundry Trade Jl., vol. 29, no. 398, Apr. 3, 1924, pp. 273–274. Growth of electric melting furnace industry. Söderberg electrode. See also Iron & Coal Trades Rev., vol. 108, no. 2928, Apr. 11, 1924, p. 596.

Electrodes. The Use of Söderberg Continuous Electrodes in Electric Steel Furnaces (Die Verwendung der Söderbergschen Dauerelektrode an Elektrostahlöfen), W. Eilender and L. Lyche. Stahl u. Eisen, vol. 44, no. 14, Apr. 3, 1924, pp. 364–368. Experimental equipment with continuous electrode on one phase of 6-ton Héroult furnace; main equipment on 3-phase operation of same furnace; working results; reducing cost of electric-steel practice; thermal efficiency of 6-ton Héroult furnace.

Increasing Capacity for Large Casting. Nine Tons in a 3-Ton Furnace, L. J. Barton. Foundry, vol. 52, no. 10, May 15, 1924, pp. 401–403, 9 figs. Capacity of electric furnace increased to melt sufficient iron to pour large gear wheel; operating door banked up about 10 in. with cement made of white sand and sodium silicate; operation at plant of Dibert, Bancroft & Ross Co., New Orleans.

ELECTRIC LOCOMOTIVES

Diesel-Electric. See LOCOMOTIVES, Diesel-Electric.

Mexican Railway. Passenger and Freight Locomotives for Mexican Railway Company, Ltd., G. H. Walker. Gen. Elec. Rev., vol. 27, no. 4, Apr. 1924, pp. 272–277, 9 figs. Mechanical and electrical details of 150-ton 3000-volt d.c. locomotive; tractive effort, 54,000 lb.; speed at 1 hr. rating, 19 m.p.h.; how locomotives have been arranged to meet service requirements of this particular electrification.

0-4-4-0 Type. Electric Goods Locomotive, Victorian Government Railways. Ry. Gaz., vol. 40, no. 17, Apr. 25, 1924, pp. 596–597, 3 figs. Particulars of two locomotives to be used for service in Melbourne metropolitan railway yards and for hauling goods trains within Melbourne suburban electrified railway area; wheel arrangement 0-4-4-0; voltage and system 1500 d.c., individual single-geared drive, maximum tractive effort 26,000 lb.

Oil-Engine-Driven. New Type Electric Locomotive. Aera, vol. 12, no. 10, May 1924, pp. 1729–1732, 4 figs. Describes locomotive using oil for its fuel, built jointly by Gen. Elec. Co. and Ingersoll-Rand Co., and especially designed for switching service; fuel-oil engine operates d. c. generator supplying current to motors without intervening accelerating resistance; fuel cost exceedingly low, and new engine is smokeless.

Oil-Electric Locomotive with Injection Type Engine. Ry. Age, vol. 76, no. 23, May 10, 1924, p. 1159, 2 figs. Electric locomotive driven by fuel-oil engine built jointly by Gen. Elec. Co. and Ingersoll-Rand Co. See also Ry. Rev., vol. 74, no. 19, May 10, 1924, pp. 846–847, 3 figs.

Pit and Quarry Haulage. Locomotives for Haulage at Pits and Quarries, H. H. Johnston. Pit and Quarry, vol. 8, no. 7, Apr. 1924, pp. 97–100, 4 figs. Notes on different types of electric locomotives, and electric equipment for haulage systems.

Turbo-Electric. See LOCOMOTIVES, Turbo-Electric.

ELECTRIC WELDING

Machines and Processes. Recent Developments of Electric Welding Machines (Die neuere Entwicklung der elektrischen Schweissmaschinen), A. Neuburger. Elektrotechnik u. Maschinenbau, vol. 42, nos. 14 and 15, Apr. 6 and 13, 1924, pp. 214–219 and 230–235, 20 figs. Description of modern processes and machines, with special reference to resistance welding.

ELECTRIC WELDING, ARC

Cast Iron. Arc Welding Cast Iron. Welding Engr., vol. 9, no. 4, Apr. 1924, pp. 22–23, 3 figs. How to use monel-metal electrode.

Copper. Summary of Information on Arc Welding of Copper, Brass and Bronze in the Literature Up to March 1923. Am. Welding Soc.—Jl., vol. 3, no. 3, Mar. 1924, pp. 9–15. Digest of literature made by sub-committee of Electric Arc Welding Committee of Am. Bur. Welding.

Gate-Valve Reclamation. An Interesting Arc Welding Operation. West. Machy. Wld., vol. 15, no. 4, Apr. 1924, pp. 125–126, 2 figs. Methods used by ReQua-Weart Co. of San Francisco, in reclamation of a 48-in. gate valve for a Nevada power company.

Manganese Steel. Correct Welding Procedure Retains Qualities of Manganese Steel, H. H. George. Elec. Ry. Jl., vol. 63, no. 16, Apr. 19, 1924, pp. 611–613. By use of arc welding in the field, life of manganese steel special work can be increased one to five years. Type of welding rod, technique employed and speed of cooling affect physical characteristics of welded material.

ELEVATORS

Passenger. Electric Passenger Lifts, H. Marryat. Instn. Elec. Engrs.—Jl., vol. 62, no. 328, Apr. 1924, pp. 325–341 and (discussion) 341–349, 12 figs. Plea for British investigation and design in order to produce elevator more especially suitable to conditions in England than is possible by following American practice too closely; outlines methods employed by author in calculating elevator capacity required in building; comparison between drum and sheave driving; refers to new system of control, called auto-pilot; safety devices.

F

FACTORIES

Inspection. Some Problems of Factory Inspection. Int. Labour Rev., vol. 9, no. 3, Mar. 1924, pp. 372–386. Brief account of main lines of development of factory inspection, both in theory and practice, taking as basis reports prepared by Int. Labor Office.

FANS

Exhaust. Things to Know About Fan Application, H. W. Pfeffer. Sheet Metal Worker, vol. 15, no. 8, May 9, 1924, pp. 283–285 and 309, 3 figs. Important truths essential to a complete understanding of how to lay out a successful exhaust system; capacities to figure on; air velocities needed; pipe sizes; general suggestions.

Mine. The Change of Air Supply in Mine Fans, A. Latsinsky. Russian Min. Jl., vol. 100, no. 1, Jan. 1924, pp. 31–34. (In Russian.)

FLIGHT

Elements of, Calculation. General Method and Chart for Calculating Elements of Airplane Flight (Méthode générale et abaque pour calculer les elements du vol d'un avion), G. Delanghe. Génie Civil, vol. 84, no. 2169, Mar. 8, 1924, pp. 222–226, 8 figs. Describes new method developed by author.

FLOW IN PIPES

Water and Air Simultaneously. Simultaneous Flow of Water and Air in Pipes, L. S. O'Bannon. Am. Soc. Heat. & Vent. Engrs.—Jl., vol. 30, no. 3, Mar. 1924, pp. 225–234, 14 figs. Describes experiments made to find capacity of pipes for carrying water and air simultaneously, within conditions of steady flow; results and methods of running experiments described under four following heads: Flow of water, flow of air, parallel flow of water and air, and counter flow of water and air.

FLOW OF FLUIDS

Dynamical Similarity, Principle of. The Principle of Dynamical Similarity, with Special Reference to Model Experiments, A. H. Gibson. Engineering, vol. 117, nos. 3037, 3038, 3039 and 3040, Mar. 14, 21, 28 and Apr. 4, 1924, pp. 325–327, 357–359, 391–393 and 422–423, 6 figs. Discusses application of principles to flow of fluid through pipes, resistance of wholly submerged and partially submerged bodies; model experiments on resistance of ships; resistance of smooth wires and cylinders; estuary model experiments; surge tanks; sea-going qualities of vessels in rough sea; suction of interaction between passing vessels; critical speed and torsional vibration of shafts.

FLOW OF GASES

Measurement. Measuring Flow of Gases, Chas. P. Turner and B. W. Winship. Chem. & Met. Eng., vol. 30, no. 16, Apr. 21, 1924, pp. 633–635, 4 figs. Results of application of mixture method, suggested by salt-solution method for measuring flow of water, show that it is of value in related problems of fluid flow.

FLOW OF STEAM

Pipes. Critical Velocity of Steam and Condensate Mixtures in Horizontal, Vertical, and Inclined Pipes, F. C. Houghton and R. L. Lincoln. Am. Soc. Heat. & Vent. Engrs.—Jl., vol. 30, no. 2, Feb. 1924, pp. 153–168, 19 figs. Details of experiments made to obtain a thorough understanding and complete knowledge of factors entering into, and effects taking place when steam is sent through a pipe in which there is a counter-flow of condensate. Effect of length and size of pipe and type of entrance, upon critical velocity.

FLYING BOATS

Short. The Short All-Metal Light Flying Boat. Flight, vol. 16, no. 16, Apr. 17, 1924, pp. 220–223, 4 figs. Built entirely of metal, with exception of wing covering, and material mainly used in construction is duralumin; two 696 cc. Blackburne engines; length 24 ft. 8½ in., span 36 ft.

FLYWHEELS

Manufacture. Maxwell Methods in Flywheel Work, F. H. Colvin. Am. Mach., vol. 60, no. 20, May 15, 1924, pp. 729–730, 5 figs. Machine equipment, together with some of tooling fixtures and handling devices; drilling and tapping in multi-spindle machines; balancing machine.

FORGING

Steam vs. Air Hammers. Steam vs. Air in Forging-Hammer Practice (Dampf oder Luft für den Hammerbetrieb), F. Beleke. Maschinenbau, vol. 3, no. 12, Mar. 27, 1924, pp. 389–394, 18 figs. Comparison of economy of steam, pneumatic and air hammers; points out applications for which each type is most adaptable.

FORGINGS

Heavy. The Production of Heavy Forgings. Mech. Eng., vol. 46, no. 5, May 1924, pp. 241–247 and 307, 15 figs. Survey of status of industry in America at present time, together with data helpful to engineer ordering forgings.

FOUNDRIES

Brass. The Operation of a Brass Foundry under Scientific Control, F. W. Rowe. Foundry Trade Jl., vol. 29, no. 399, Apr. 10, 1924, pp. 291–294 and (discussion) 294–296, 5 figs. Layout of brass foundries, provision of suitable stores, recording stocks, charge sheets, inspection of castings of new design, melting and casting procedure, casting temperature, etc.

Costs. Why Foundry Costs Vary on Rough Castings, A. Luenberg. Can. Foundryman, vol. 15, no. 3, Mar. 1924, pp. 14–15, 3 figs. Uniform cost-finding method for foundries; individual cost of castings based on actual time prevents confusion in locating leaks.

Ford Motor Co., Detroit. Jobbing Foundry of Ford Motor Co., F. L. Prentiss. Iron Age, vol. 113, no. 21, May 22, 1924, pp. 1485–1489, 8 figs. Iron, steel and non-ferrous departments; blast furnace, cupola and electrically melted metals used; new steel plant.

Malleable-Iron. Iron Supply Governs Location. Foundry, vol. 52, no. 10, May 15, 1924, pp. 389–395, 11 methods. Methods and equipment of Cadillac Malleable Iron Co., Cadillac, Mich., which chose site near source of charcoal-iron production; interplant transportation features, ladles, etc.

Modern Practice. Recent Evolution in Foundry Practice (Evolution récente de la fonderie), E. Ronceray. Revue de Métallurgie, vol. 21, nos. 1, 2 and 3, Jan., Feb. and Mar., 1924, pp. 4–11, 112–120 and 183–194, 16 figs. Jan.: General progress; semi-steel; fuels; American malleable; light metals; melting apparatus; heating furnaces. Feb.: Molding and casting; dry-sand and chill casting; molding machines. Mar.: Core and patternmaking; general layout of foundries.

FRICTION GEARING

Slip. Experiments on the Friction of Solid Bodies (Versuche über die Reibung fester Körper). Zeit. für angewandte Mathematik u. Mechanik, vol. 4, no. 1, Feb. 1924, pp. 1–32. Investigation of slip of driving disk in excess of distance corresponding to its actual revolution; deals with changes in surfaces and their influence on friction values, and progress of slip at different speeds, with normal and peripheral forces; deformations of disks as cause of slip; gives coefficients of friction for various combinations of metals, wood and leather.

FUELS

Colloidal. Experimental Preparation of Colloidal Fuel, A. V. Sapoznikow and M. N. Kalinin. Petroleum & Oil-Shale Industry, vol. 5, no. 11–12, Nov.-Dec. 1923, pp. 652–654. (In Russian.)

Combustion, Maximum Temperatures and Pressures in. An Investigation of the Maximum Temperatures and Pressures Attainable in the Combustion of Gaseous and Liquid Fuels, G. A. Goodenough and G. T. Felbeck. Univ. of Ill. Bul., no. 139, Mar. 1924, 158 pp., 27 figs. Résumé of important laws of gas mixtures; general theory of chemical equilibrium, and derivation of equilibrium equations for various reactions; develops energy equation, and shows method of solving system of equations for maximum temperature; comparisons and applications of theory.

Furnace Residue. Investigation of Furnace Residue of Anthracite (Zur Kenntnis und zur Untersuchung der Feuerungsrückstände von Steinkohlen), E. Donath. Berg- u. Hüttenmännisches Jahrbuch, vol. 71, no. 4, 1923, pp. 24–27. Describes modification of method for preparation of residue according to which ferrous oxide and sulphur compounds and in fact main part of mineral substances are dissolved away.

Lignite and Bituminous Mixtures. Burning Mixtures of Lignite and Bituminous, A. Canfield. Power Plant Eng., vol. 28, no. 9, May 1, 1924, pp. 476–477, 4 figs. Experiments carried out at power plant of State Mill & Elevator, Grand Forks, N. Dak., during past six months to determine most economical ratio of lignite to be burned with Eastern bituminous.

Lignite Char. Tests of Lignite Char as Reduction Fuel in the Smelting of Zinc Ores, B. M. O'Harra. U. S. Bur. Mines, Reports of Investigations, No. 2575, Feb. 1924, 7 pp. Analysis and characteristics of and experiments made with "char," the fuel produced by a simple carbonizing oven devised by Bur. of Mines which is essentially a vertical shaft with means for supplying raw lignite at top and discharging carbonized lignite at lower end. From Zinc Inst. Bul., Jan. 1924.

Pulpwood Bark. Utilization of Pulpwood Bark for Fuel, J. D. Rue and E. P. Gleason. Paper Trade Jl., vol. 78, no. 16, Apr. 17, 1924, pp. 40–50, 10 figs. Final report of Sub-Committee on Utilization of Bark, Committee on Waste of Technical Assn. Pulp & Paper Industry, dealing with possible methods of utilization, present practice in barking, bark presses, and furnaces for burning bark.

Manufactured by Advertisers — CLASSIFIED LIST OF MECHANICAL EQUIPMENT — Alphabetical List on page 152

Gears, Bakelite
* Foote Bros. Gear & Machine Co.
Ganschow, Wm. Co.
Nuttall, R. D. Co.

Gears, Bronze
* Foote Bros. Gear & Machine Co.
Nuttall, R. D. Co.

Gears, Cut
* Brown, A. & F. Co.
Chain Belt Co.
Hill Clutch Machine & Fdry. Co.
* De Laval Steam Turbine Co.
Farrel Foundry & Machine Co.
* Fawcus Machine Co.
* Foote Bros. Gear & Machine Co.
* James, D. O. Mfg. Co.
Johnson, Carlyle Machine Co.
* Jones, W. A. Fdry. & Mach. Co.
Link-Belt Co.
Mackintosh-Hemphill Co.
* Medart Co.
Nuttall, R. D. Co.
Philadelphia Gear Works

Gears, Fibre
* Foote Bros. Gear & Machine Co.
* General Electric Co.
* James, D. O. Mfg. Co.
Nuttall, R. D. Co.

Gears, Grinding
Farrel Foundry & Machine Co.

Gears, Helical
Farrel Foundry & Machine Co.
* Foote Bros. Gear & Machine Co.
Nuttall, R. D. Co.

Gears, Herringbone
* Falk Corporation
Farrel Foundry & Machine Co.
* Fawcus Machine Co.
* Foote Bros. Gear & Machine Co.
Nuttall, R. D. Co.

Gears, Machine Molded
* Brown, A. & F. Co.
Farrel Foundry & Machine Co.
* Jones, W. A. Fdry. & Mach. Co.
Link-Belt Co.

Gears, Micarta
* Foote Bros. Gear & Machine Co.
* Westinghouse Elec. & Mfg. Co.

Gears, Rawhide
Farrel Foundry & Machine Co.
* Foote Bros. Gear & Machine Co.
Ganschow, Wm. Co.
* James, D. O. Mfg. Co.
Nuttall, R. D. Co.
Philadelphia Gear Works

Gears, Speed Reduction
Chain Belt Co.
* De Laval Steam Turbine Co.
* Falk Corporation
Farrel Foundry & Machine Co
* Fawcus Machine Co.
* Foote Bros. Gear & Machine Co.
Ganschow, Wm. Co.
* General Electric Co.
Hill Clutch Machine & Foundry Co.
* James, D. O. Mfg. Co.
* Jones, W. A. Fdry. & Mach. Co.
* Kerr Turbine Co.
Link-Belt Co.
Nuttall, R. D. Co.
Palmer-Bee Co.
* Sturtevant, B. F. Co.
* Westinghouse Electric & Mfg. Co.

Gears, Steel
* Foote Bros. Gear & Machine Co.
Hill Clutch Machine & Fdry. Co.
Nuttall, R. D. Co.

Gears, Worm
Chain Belt Co.
* Cleveland Worm & Gear Co.
* Fawcus Machine Co.
* Foote Bros. Gear & Machine Co.
Ganschow, Wm. Co.
* Gifford-Wood Co.
* James, D. O. Mfg. Co.
* Jones, W. A. Fdry. & Mach. Co.
Link-Belt Co.
Nuttall, R. D. Co.

Generating Sets
* Allis-Chalmers Mfg. Co.
* American Blower Co.
* Clarage Fan Co.
* Coppus Enginering Corp'n
* De Laval Steam Turbine Co.
* Engberg's Electric & Mech. Wks.
* General Electric Co.
* Kerr Turbine Co.
Ridgway Dynamo & Engine Co.
* Sturtevant, B. F. Co.
* Westinghouse Electric & Mfg. Co.

Generators, Electric
* Allis-Chalmers Mfg. Co.
* De Laval Steam Turbine Co.
* Engberg's Electric & Mech. Wks.
* General Electric Co.
* Nordberg Mfg. Co.
Ridgway Dynamo & Engine Co.
* Westinghouse Electric & Mfg. Co.

Governors, Air Compressor
* Foster Engineering Co.
* Mason Regulator Co.

Governors, Engine, Oil
* Nordberg Mfg. Co.

Governors, Engine, Steam
* Nordberg Mfg. Co.

Governors, Oil Burner
* Foster Engineering Co.
* Mason Regulator Co.

Governors, Pressure
* Tagliabue, C. J. Mfg. Co.

Governors, Pump
* Bowser, S. F. & Co. (Inc.)
* Foster Engineering Co.
* Kieley & Mueller (Inc.)
* Mason Regulator Co.
Squires, C. E. Co.
* Tagliabue, C. J. Mfg. Co.

Governors, Steam Turbine
* Foster Engineering Co.

Governors, Water Wheel
* Worthington Pump & Machinery Corp'n

Granulators
* Smidth, F. L. & Co.

Graphite, Flake (Lubricating)
* Dixon, Joseph Crucible Co.

Grate Bars
* Casey-Hedges Co.
* Combustion Engineering Corp'n
* Erie City Iron Works
* Titusville Iron Works Co.
* Vogt, Henry Machine Co.

Grate Bars (for Overfeed and Underfeed Stokers)
Furnace Engineering Co.

Grates, Dumping
* Combustion Engineering Corp'n
* Titusville Iron Works Co.
* Vogt, Henry Machine Co.

Grates, Shaking
* Casey-Hedges Co.
* Combustion Engineering Corp'n
* Erie City Iron Works
* Springfield Boiler Co.
* Titusville Iron Works Co.
* Vogt, Henry Machine Co.

Grating, Flooring
* Irving Iron Works Co.

Grease Cups
(See Oil and Grease Cups)

Grease Extractors
(See Separators, Oil)

Greases
* Dixon, Joseph Crucible Co.
* Royersford Fdry. & Mach. Co.
Vacuum Oil Co.

Grinding Machinery
* Brown, A. & F. Co.
* Smidth, F. L. & Co.

Grinding Machines, Chaser
* Landis Machine Co. (Inc.)

Grinding Machines, Floor
* Builders Iron Foundry
* Royersford Fdry. & Mach. Co.

Gun Metal Finish
* American Metal Treatment Co.

Hammers, Drop
* Franklin Machine Co.
* Long & Allstatter Co.

Hammers, Pneumatic
* Ingersoll-Rand Co.

Handles, Machine, Steel
Rockwood Sprinkler Co.

Hangers, Shaft
* Brown, A. & F. Co.
Chain Belt Co.
* Falls Clutch & Machinery Co.
Hill Clutch Machine & Fdry. Co.
* Jones, W. A. Fdry. & Mach. Co.
Link-Belt Co.
* Medart Co.
* Royersford Fdry. & Mach. Co.
* Wood's, T. B. Sons Co.

Hangers, Shaft (Ball Bearing)
* Hyatt Roller Bearing Co.
* S K F Industries (Inc.)

Hangers, Shaft (Roller Bearing)
* Hyatt Roller Bearing Co.
* Jones, W. A. Fdry. & Mach. Co.

Hard Rubber Products
* United States Rubber Co.

Hardening
* American Metal Treatment Co.

Heat Exchangers
* Croll-Reynolds Engineering Co.

Heat Treating
* American Metal Treatment Co.
Nuttall, R. D. Co.

Heaters, Feed Water (Closed)
Bethlehem Shipbldg Corp'n(Ltd.)
* Cochrane Corp'n
* Croll-Reynolds Engineering Co.
* Erie City Iron Works
* Schutte & Koerting Co.
* Walsh & Weidner Boiler Co.
* Wheeler, C. H. Mfg. Co.
* Wheeler Cond. & Engrg. Co.
* Worthington Pump & Machinery Corp'n

Heaters, Feed Water, Locomotive (Open)
* Worthington Pump & Machinery Corp'n

Heaters, Oil
* Power Specialty Co.

Heaters and Purifiers, Feed Water, Metering
* Cochrane Corp'n

Heaters and Purifiers, Feed Water (Open)
* Cochrane Corp'n
Elliott Co.
* Erie City Iron Works
Hoppes Mfg. Co.
* Springfield Boiler Co.
* Wickes Boiler Co.
* Worthington Pump & Machinery Corp'n

Heating and Ventilating Apparatus
* American Blower Co.
* American Radiator Co.
* Clarage Fan Co.
* Sturtevant, B. F. Co.

Heating Specialties
* Foster Engineering Co.
* Fulton Co.

Heating Specialties, Vacuum
* Foster Engineering Co.

Hoisting and Conveying Machinery
* Brown Hoisting Machinery Co.
Chain Belt Co.
Clyde Iron Works Sales Co.
* Gifford-Wood Co.
* Jones, W. A. Fdry. & Mach. Co.
Lidgerwood Mfg. Co.
Link-Belt Co.

Hoists, Air
* Ingersoll-Rand Co.
* Nordberg Mfg. Co.
Palmer-Bee Co.
* Whiting Corp'n

Hoists, Belt
Clyde Iron Works Sales Co.
Lidgerwood Mfg. Co.

Hoists, Chain
Palmer-Bee Co.
* Yale & Towne Mfg. Co.

Hoists, Electric
* Allis-Chalmers Mfg. Co.
* American Engineering Co.
* Brown Hoisting Machinery Co.
Clyde Iron Works Sales Co.
* General Electric Co.
Lidgerwood Mfg. Co.
Link-Belt Co.
* Nordberg Mfg. Co.
* Yale & Towne Mfg. Co.

Hoists, Gas and Gasoline
Lidgerwood Mfg. Co.

Hoists, Head Gate
Smith, S. Morgan Co.

Hoists, Locomotive & Coach
* Whiting Corp'n

Hoists, Mine
Lidgerwood Mfg. Co.
* Nordberg Mfg. Co.

Hoists, Skip
* Brown Hoisting Machinery Co.
Lidgerwood Mfg. Co.
Link-Belt Co.
Palmer-Bee Co.

Hoists, Steam
(See Engines, Hoisting)

Hose, Acid
* United States Rubber Co.

Hose, Air and Gas
* Goodrich, B. F. Rubber Co.
* United States Rubber Co.

Hose, Fire
* United States Rubber Co.

Hose, Gas
* United States Rubber Co.

Hose, Gasoline
* Goodrich, B. F. Rubber Co.
* United States Rubber Co.

Hose, Metal, Flexible
Johns-Manville (Inc.)

Hose, Oil
* United States Rubber Co.

Hose, Rubber
* Goodrich, B. F. Rubber Co.
* United States Rubber Co.

Hose, Steam
* United States Rubber Co.

Hose, Suction
* United States Rubber Co.

Humidifiers
* American Blower Co.
* Carrier Engineering Corp'n
* Sturtevant, B. F. Co.

Humidity Control
* American Blower Co.
* Carrier Engineering Corp'n
* Sturtevant, B. F. Co.
* Tagliabue, C. J. Mfg. Co.

Hydrants, Fire
Kennedy Valve Mfg. Co.
Murdock Mfg. & Supply Co.
* Reading Steel Casting Co. (Inc.) (Pratt & Cady Division)
* Worthington Pump & Machinery Corp'n

Hydrants, Yard
Murdock Mfg. & Supply Co.

Hydraulic Machinery
* Allis-Chalmers Mfg. Co.
* Ingersoll-Rand Co.
Mackintosh-Hemphill Co.
* Worthington Pump & Machinery Corp'n

Hydraulic Press Control Systems (Oil Pressure)
* American Fluid Motors Co.

Hydrokineters
Bethlehem Shipbldg Corp'n(Ltd.)
* Schutte & Koerting Co.

Hydrometers
* Tagliabue, C. J. Mfg. Co.
* Taylor Instrument Cos.

Hygrometers
* Tagliabue, C. J. Mfg. Co.
* Taylor Instrument Cos.
Weber, F. Co. (Inc.)

Ice Handling Machinery
Palmer-Bee Co.

Ice Making Machinery
* De La Vergne Machine Co.
* Frick Co. (Inc.)
* Ingersoll-Rand Co.
Johns-Manville (Inc.)
* Nordberg Mfg. Co.
* Vilter Mfg. Co.
* Vogt, Henry Machine Co.

Ice Tools
* Gifford-Wood Co.

Idlers, Belt
Hill Clutch Machine & Fdry. Co.
* Smidth, F. L. & Co.

Indicator Posts
* Crane Co.
Kennedy Valve Mfg. Co.
* Reading Steel Casting Co. (Inc.) (Pratt & Cady Division)

Indicators, CO_2
* Uehling Instrument Co.

Indicators, CO_2
Bacharach Industrial Instrument Co.
* Uehling Instrument Co.

Indicators, Engine
* American Schaeffer & Budenberg Corp'n
Bacharach Industrial Instrument Co.
* Crosby Steam Gage & Valve Co.

Indicators, Sight Flow
* Bowser, S. F. & Co. (Inc.)

Indicators, SO_2
* Uehling Instrument Co.

Indicators, Speed
* American Schaeffer & Budenberg Corp'n
Veeder Mfg. Co.

Injectors
* Schutte & Koerting Co.

Injectors, Air
* Croll-Reynolds Engrg. Co.

Instruments, Electrical Measuring
* General Electric Co.
* Taylor Instrument Cos.
* Westinghouse Electric & Mfg. Co.

Instruments, Oil Testing
* Tagliabue, C. J. Mfg. Co.

*Catalogue data of firms marked * adpear in the A.S.M.E. Condensed Catalogues of Mechanical Equipment. 1923-24 Volume*

Solid, Chemical Constitution. Modern Theories on the Chemical Constitution of Solid Fuels (Les théories modernes sur la constitution chimique des combustibles solides), E. Audibert and A. Raineau. Chimie & Industrie, vol. 11, nos. 2 and 3, Feb. and Mar. 1924, pp. 229–247 and 434–448, 1 fig. Review of works on this subject during recent years: Constituents of higher plants; carbon hydrates; natural state, properties and constitution of lignines; humic acids; conversion from plant to humic acid and from humic acid to humic substances; investigations tend to confirm existing lack of knowledge on subject of chemical constitution of solid fuels. See also Revue de l'industrie Minérale, no. 78, Mar. 15, 1924, pp. 127–171, 1 fig.

[See also COAL; LIGNITE; OIL FUEL; PULVERIZED COAL.]

FURNACES, HEAT-TREATING

Continuous. Continuous Furnaces Prove Advantageous in Heat Treating Automobile Parts, E. C. Cook. Fuels & Furnaces, vol. 2, no. 4, Apr. 1924, pp. 341–346, 8 figs. Notes on furnaces used for annealing, hardening, quenching and tempering at plant of Chevrolet Motor Ohio Co., at Toledo, Ohio.

FURNACES, INDUSTRIAL

Electricity, Use of. Furnaces and Heat Sources, E. F. Collins. Fuels & Furnaces, vol. 2, no. 5, May 1924, pp. 479–483. Reasons for wider and more general adoption of electric heat in past few years. Some fundamental considerations which determine when electric heat should be used.

Recuperation, Advantages of. Recuperation—Its Advantages, E. R. Posnack. Combustion, vol. 10, no. 5, May 1924, pp. 362–363. Advantages of recuperation in industrial furnaces.

G

GAGES

Hydrostatic. How to Compensate for Temperature Effects on Hydrostatic Gages, J. P. Nikonow. Automotive Industries, vol. 50, no. 18, May 1, 1924, pp. 964–966, 3 figs. Fluctuations in atmospheric temperature change volume of entrapped air and thus vary readings; practical method of balancing this factor is worked out.

GAS ENGINES

Foundations. Foundations for Gas Engines. Power Engr., vol. 19, no. 217, Apr. 1924, pp. 125–127, 8 figs. Design and construction of foundations suitable for internal-combustion engines, and particularly gas plants.

Ignition Equipment. Ignition Equipment for a 7,500-Hp. Gas Engine. Engineering, vol. 117, no. 3039, Mar. 28, 1924, pp. 394–395, 4 figs. Set of equipment supplied by Lodge Bros. & Co. for gas engine; details of contact maker, igniter, timing unit and sparking plug.

GAS PRODUCERS

Bituminous Coal as Fuel. Central District Bituminous Coals as Water-Gas Generator Fuel, W. E. Odell and W. A. Dunkley. U. S. Bur. Mines, Bul. 203, 1924, 92 pp., 11 figs. Results of investigation made which consisted of study of practice already developed and difficulties encountered, development of operating methods that would obviate these difficulties, testing various coals of Central District to determine which might be considered for this purpose, and study of technical conditions involved in manufacture of water gas from bituminous coals.

Regulation. Tests on Regulation of Gas Producers and Open-Hearth Furnaces (Versuche zur Einregelung von Gaserzeuger und Siemens-Martin-Ofen), Geo. Bulle. Stahl u. Eisen, vol. 44, no. 15, Apr. 10, 1924, pp. 397–403, 6 figs. Summary of measurements carried out on 7 producer plants and 3 open-hearth works; determination of influence of varying steam consumption, load and treatment on producers; tests on open-hearth furnaces to ascertain correct quantity of air and best mixing conditions of coke-oven and producer gas; description of necessary measuring equipment.

GAS TURBINES

Developments. The Gas Turbine, F. Doflin. Instn. Mech. Engrs.—Proc., vol. 2, no. 6, 1923, pp. 1121–1135, 2 figs. Account of most noteworthy attempts to produce efficient and reliable gas turbine; summary of results obtained and indication of possible future developments. (Abridged.)

Holzwarth. The Holzwarth Gas Turbine. Power Engr., vol. 19, no. 217, Apr. 1924, pp. 140–142, 6 figs. Chronicle of progress actually made with this design.

Stauber. New Methods of Energy Generation—Stauber Gas Turbine, Löffler. Mech. Eng., vol. 46, no. 5, May 1924, pp. 284–285, 1 fig. Discusses various new paths sought and partly opened up in domain of power generation, and describes construction of Stauber turbine being experimentally operated by German Gen. Elec. Co. in Berlin. Translated from Zeit. des Vereines deutscher Ingenieure, vol. 68, no. 8, Feb. 23, 1924, pp. 161–169.

GASES

Combustion at High Pressure. Gaseous Combustion at High Pressures, Wm. A. Bone, D. M. Newitt and D. T. A. Townend. Roy. Soc.—Proc., vol. 105, no. A732, Apr. 1, 1924, pp. 406–433, 6 figs. Influence of varying initial pressures upon rate of pressure development and activation of nitrogen in carbon monoxide-air explosions.

GEAR CUTTING

Hobbing Machines. Gould & Eberhardt No. 72-H Automatic Gear Hobbing Machine. Am. Mach., vol. 60, May 1, 1924, pp. 669–670, 2 figs. Adapted for cutting of gears up to 27 in. in diam.

GEARS

Bevel. Spiral Bevel Gears. Machy. (Lond.), vol. 24, no. 605, May 1, 1924, pp. 138–141, 6 figs. Deals with type produced on Gleason principle in which, owing to spiral effect tooth thickness cannot be measured on outer circumference as can be done in case of straight-tooth bevel gears, but should be measured across normal section of tooth.

Differential. Methods of Machine Tool Design, A. L. De Leeuw. Am. Mach., vol. 60, no. 17, Apr. 24, 1924, pp. 621–624, 5 figs. Differential gearing finds its principal machine-tool application in feed mechanism; differential indexing mechanisms.

Profiles. On the Profiles of Gear, S. Hashimoto. Tokyo, Japan, Dept. of Railways Bul., vol. 12, no. 2, Feb. 10, 1924, pp. 1–20, 12 figs. (In Japanese.)

Spiral Bevel. The Application of Spiral Bevel Gears, F. E. McMullen. Am. Mach., vol. 60, no. 20, May 15, 1924, pp. 721–722. Paper presented before Am. Gear Mfrs. Assn.

GRINDING MACHINES

Disk. The Use of Fixtures in Disk-Grinding, H. Campbell. Am. Mach., vol. 60, no. 21, May 22, 1924, pp. 759–761, 9 figs. Grinding production determined largely by types of fixture used; recently developed work holders; grinding piston rings automatically; better work and higher production with less labor.

High-Traverse. New Landis Grinder Has Stationary Head. Automotive Industries, vol. 50, no. 19, May 8, 1924, p. 1017, 2 figs. Designed to meet demand for oversize precision grinding with long-lived speed production; number of pieces ground per dressing of wheel said to offset higher initial cost.

Internal. Productive Internal Grinding. Brit. Machine Tool Eng., vol. 3, no. 26, Mar.-Apr. 1924, pp. 30–32, 5 figs. Describes internal-grinding machine made by Churchill Machine Tool Co., adapted to suit special piece of work; main features and operation.

H

HARDNESS

Ball Hardness Testing. The Accurate Determination of the Hardness of Metals. Engineering, vol. 117, no. 3043, Apr. 25, 1924, pp. 518–519, 5 figs. Investigation of Brinell test with object in view of designing method of testing which yields Brinell hardness numerals of thoroughly reliable order, free from irregularities to which Brinell test is exposed when carried out in ordinary way.

Indentation. In the Indentation Hardness of Metals, K. Honda and K. Takahasi. Iron & Steel Inst.—advance paper, no. 10, for mtg. May 1924, 11 pp., 6 figs. Points out that Brinell hardness, when impression is measured during application of load, is quite correct, and much less than that by usual method of measurement; new definition of hardness is given.

Magnetic Tests. A Correlation between the Mechanical Hardness and the Magneto-restrictive Effects of Ferromagnetic Substances, S. R. Williams. Am. Soc. Steel Treating—Trans., vol. 5, no. 4, Apr. 1924, pp. 362–368, 3 figs. Method of determining physical properties of metals through magnetic means; relative merits of X-ray and magnetic means of determining flaws in metals; Joule effect; discusses experiments wherein endeavor was made to relate magnetostriction and hardness of ferromagnetic substances.

Steel Balls, Magnetic Test. Hardness of Steel Balls by Magnetic Tests, S. R. Williams. Am. Soc. Steel Treating—Trans., vol. 5, no. 5, May 1924, pp. 479–484, 4 figs. Rapid method of determining magnetically hardness of steel balls; with this method it is possible to conduct 100-per cent inspection on balls for hardness, with considerable rapidity; illustrations showing schematic arrangement of author's apparatus, and set-up and graphs of certain tests made upon balls having different degrees of hardness.

HEAT TRANSMISSION

Boilers. The Transmission of Heat in Boilers, W. N. Booth. Gas Wld., vol. 80, no. 2071, Mar. 29, 1924, pp. 288–290, 6 figs. Conditions which affect flow of gas adjacent to a solid surface; conduction and convection; transmission of heat through boiler plates. Paper read before Lond. & Southern District Jr. Gas Assn. See also Gas Jl., vol. 166, no. 3177, Apr. 2, 1924, pp. 36–38, 6 figs.

Buildings. An Improved Method of Determining the Heat Transfer Through Wall, Floor, and Roof Sections, R. F. Norris, H. H. Germond and C. M. Tuttle. Am. Soc. Heat. & Vent. Engrs.—Jl., vol. 30, no. 2, Feb. 1924, pp. 109–114, 1 fig. Describes method developed in Burgess laboratories and apparatus used.

Problems. Heat Transfer Symposium. Indus. & Eng. Chem., vol. 16, no. 5, May 1924. Contains following articles: Heat Transmission from Bare and Insulated Pipes, R. H. Heilman, pp. 451–458, 10 figs.; Heat Transmission in an Inclined Rapid Circulation Type Vacuum Evaporator, D. J. Van Marie, pp. 458–459, 2 figs.; Forced Convection of Heat in Gases and Liquids, Chester W. Rice, pp. 460–467, 4 figs.; Optimum Operating Conditions for Pipe Heating and Cooling Equipment, W. K. Lewis, J. T. Ward and E. Voss, pp. 467–468; Heat Transfer in Enamel-Lined Apparatus, E. P. Poste, pp. 469–470; Characteristics of Air-Blast Heaters, F. R. Ellis and J. D. White, pp. 471–473, 8 figs.; Studies in Evaporator Design—Effect of Surface Conditions, L. A. Pridgeon and W. L. Badger, pp. 474–478, 3 figs.; Evaporator Scale Formation, W. L. McCabe and C. S. Robinson, pp. 478–479, 3 figs.; The Film Concept of Heat Transmission Applied to a Commercial Water Heater, D. K. Dean, pp. 479–483, 3 figs.; Loss of Heat from Furnace Walls, Rob. Calvert and L. Caldwell, pp. 483–490, 11 figs.; A Heat Transmission Meter, P. Nicholls, pp. 490–493, 3 figs.

Heat Transfer Symposium. Chem. & Met. Eng., vol. 30, no. 17, Apr. 28, 1924, pp. 661–665. Review of series of practical technical papers summarizing present knowledge of process. Abstracts of papers read before Am. Chem. Soc.

HEATING AND VENTILATING

Air Leakage in Buildings. Air Leakage Through the Openings in Buildings, F. C. Houghten. Am. Soc. Heat. & Vent. Engrs.—Jl., vol. 30, no. 2, Feb. 1924, pp. 121–134, 11 figs. Method employed in investigation of double-hung windows, 2 ft. 8 in. by 5 ft. 2 in. by 1⅛ in., in a 13-in. brick wall, plastered on inside with cement plaster; results are given for leakage, through such a window without weatherstripping and with two types of weather stripping, around frame, and through brick wall itself.

HEATING, STEAM

Central-Station. Distribution and Regulation of Heat in Central Heating Plants (Distribution et Réglage de la Chaleur dans les installations de chauffage central par l'eau et la vapeur), A. Nessi and L. Nisolle. Chaleur & Industrie, vol. 4, no. 44, Dec. 1923, pp. 945–951 and vol. 5, no. 45, Jan. 1924, pp. 27–32, 6 figs. Discusses means and possibilities of improving economic efficiency of central heating stations.

HYDRAULIC MACHINERY

Glycerine, Use in. Study on the Use of Glycerine in Hydraulic Machinery (Etude sur l'emploi de la glycérine dans les appareils hydrauliques), F. Mercier. Revue Industrielle, vol. 54, no. 2177, Apr. 1924, pp. 52–57, 4 figs. Study of properties of glycerine and its action on metals, based on experience of 30 years extending over more than 1200 apparatus; author concludes that hydraulic or hydropneumatic apparatus of any kind, making use of glycerine, should be constructed so that in no case glycerine can come in contact with surfaces of different metallic nature.

HYDRAULIC TURBINES

Bearings and Vibration Conditions. Experience with Bearings and Vibration Conditions of Large Hydroelectric Units, J. Harisberger. Am. Inst. Elec. Engrs.—Jl., vol. 43, no. 5, May 1924, pp. 428–429, 1 fig. Troubles experienced with hydraulic turbines installed at Snoqualmie Falls and White River power stations, and remedies applied.

Efficiency Tests. Hydraulic Turbine Efficiency, F. Johnstone-Taylor. Power Plant Eng., vol. 28, no. 8, Apr. 15, 1924, pp. 436–437, 3 figs. Describes method of conducting efficiency tests and gives test results.

Kaplan. Test Results with Storek-Kaplan Turbines (Versuchsergebnisse von Storek-Kaplanturbinen), H. Mikyska. Zeit. des Vereines deutscher Ingenieure, vol. 68, no. 17, Apr. 26, 1924, pp. 416–418, 12 figs. Describes test apparatus and shows with aid of brake curves that Kaplan turbine follows Prof. Camerer's law for increasing size of turbines in certain cases; results of successful tests for elimination of cavitations.

Large Installations. Two Modern Turbine Installations (Zwei moderne Turbinenanlagen), R. Hofmann. Zeit. des Vereines deutscher Ingenieure, vol. 68, no. 16, Apr. 19, 1924, pp. 397–400, 12 figs. 14,300-hp. Pelton turbines of the Amsteg hydroelectric plant of the Swiss Federal Ry., and large Francis high-speed turbines of Mauzac hydroelectric plant, France; details of governors, safety arrangements, etc.

Lawaczeck. The Lawaczeck Turbine and Turbine Problems Connected Therewith (Om Lawaczeck-turbinen och därmed sammanhängande turbinproblem), E. Svala. Teknisk Tidskrift, vol. 54, no. 16, Apr. 19, 1924, pp. 39–47 (Mekanik), 21 figs. A high-speed hydraulic turbine of a new and simple design and high efficiency.

Machining Cast-Steel Casings. Machining Massive Parts of the World's Largest Prime Movers, E. J. Armstrong. Mech. Eng., vol. 46, no. 5, May 1924, pp. 263–267, 9 figs. Methods used for machining large cast-steel casings for 70,000-hp. hydraulic turbines installed at Niagara Falls.

Spiral. Large Spiral Turbines for Omine Hydroelectric Plant in Japan (Gross Spiralturbinen für das Kraftwerk Omine in Japan), v. Troeltsch. Zeit. des Vereines deutscher Ingenieure, vol. 68, no. 15, Apr. 12, 1924, pp. 377–378, 3 figs. Describes spiral turbines with vertical shaft built by J. M. Voith, Heidenheim, Germany.

HYDROELECTRIC DEVELOPMENTS

Centralization of. The Tendency Toward Centralization of Power Development, W. L. Abbott. Mun. & County Eng., vol. 66, no. 4, Apr. 1924, pp. 165–171, 2 figs. What various states are doing; consolidation of stations; rail transmission of power cheaper than wire transmission; how railway coal freight schedules are made up; etc. Paper read at annual mtg. of Ill. Soc. Engrs.

Davis Bridge Project. Davis Bridge Development of the New England Power Company. Power, vol. 59, no. 20, May 13, 1924, pp. 776–779, 8 figs. Project on Deerfield River involves earth dam 200 ft. high, storage reservoir of 50,000,000,000 cu. ft. capacity, 13,000-ft. tunnel and three 20,000-hp. units for head varying from 300 to 390 ft.

Isle Maligne, Canada. Isle Maligne Hydro-Electric Development, J. P. Chapleau. Can. Engr., vol. 46, no. 19, May 6, 1924, pp. 487–489, 5 figs. Large power development being undertaken by Quebec Development Co., on Saguenay River at Isle Maligne station; 12 turbine units will be installed having a total capacity of 540,000 hp.; details of turbine construction.

Manufactured by Advertisers

CLASSIFIED LIST OF MECHANICAL EQUIPMENT

Alphabetical List on page 152

Instrument, Recording
* American Schaeffer & Budenberg Corp'n
* Ashton Valve Co.
Bacharach Industrial Instrument Co.
* Bailey Meter Co.
* Bristol Co.
* Builders Iron Foundry
* Crosby Steam Gage & Valve Co.
* General Electric Co.
* Tagliabue, C. J. Mfg. Co.
* Taylor Instrument Cos.
* Uehling Instrument Co.
* Westinghouse Electric & Mfg. Co.

Instruments, Scientific
* Taylor Instrument Cos.
Weber, F. Co. (Inc.)

Instruments, Surveying
Dietzgen, Eugene Co.
Keuffel & Esser Co.
New York Blue Print Paper Co.
ParVell Laboratories
U. S. Blue Co.
Weber, F. Co. (Inc.)

Insulating Materials (Electrical)
* General Electric Co.
Johns-Manville (Ince.

Insulating Materials (Heat and Cold)
* Celite Products Co.
Johns-Manville (Inc.)
* King Refractories Co. (Inc.)
* Quigley Furnace Specialties Co.

Insulation, Boiler
Carey, Philip Co.
* Celite Products Co.

Insulation, Heat
Carey, Philip Co.

Joints, Expansion
Carey, Philip Co.
* Crane Co.
* Croll-Reynolds Engineering Co.
Hamilton Copper & Brass Works
Lunkenheimer Co.
* Pittsburgh Valve, Fdry. & Const. Co.
* United States Rubber Co.
* Wheeler, C. H. Mfg. Co.

Joints, Flanged Pipe
* Crane Co.
* Pittsburgh Valve, Fdry. & Const. Co.

Joints, Flexible
* Barco Mfg. Co.

Joints, Swing and Swivel
* Barco Mfg. Co.
Lunkenheimer Co.

Kettles, Steam Jacketed
* Cole, R. D. Mfg. Co.
* Nordberg Mfg. Co.
* Titusville Iron Works Co.

Keys, Machine
* Smith & Serrell
* Whitney Mfg. Co.

Keyseating Machines
* Whitney Mfg. Co.

Kilns, Dry (Brick, Lumber, Stone, etc.)
* American Blower Co.
* Sturtevant, B. F. Co.

Ladles
* Whiting Corp'n

Lamps, Incandescent
* General Electric Co.
Johns-Manville (Inc.)
* Westinghouse Electric & Mfg. Co.

Land-Clearing Machinery
Clyde Iron Works Sales Co.

Lathes, Automatic
* Jones & Lamson Machine Co.

Lathes, Brass
* Warner & Swasey Co.

Lathes, Chucking
* Jones & Lamson Machine Co.

Lathes, Engine
* Builders Iron Foundry

Lathes, Turret
* Jones & Lamson Machine Co.
* Warner & Swasey Co.

Levers, Flexible (Wire)
* Gwilliam Co.

Lifts, Lumber
Leitelt Iron Works

Lighting Equipment
* Westinghouse Elect. & Mfg. Co.

Linings, Brake
Johns-Manville (Inc.)

Linings, Furnace
* Celite Products Co.
Johns-Manville (Inc.)
* King Refractories Co. (Inc.)
* McLeod & Henry Co.
* Quigley Furnace Specialties Co.

Linings, Stack
Johns-Manville (Inc.)

Loaders, Portable
* Gifford-Wood Co.
Link-Belt Co.

Locomotives, Electric
* General Electric Co.
* Westinghouse Electric & Mfg. Co.

Locomotives, Storage Battery
* General Electric Co.
* Westinghouse Electric & Mfg. Co.

Logging Machinery
Clyde Iron Works Sales Co.
Lidgerwood Mfg. Co.

Looms
Fletcher Works

Lubricants
* Dixon, Joseph Crucible Co.
* Royersford Fdry. & Mach. Co.
Vacuum Oil Co.

Lubricating Systems
* Bowser, S. F. & Co. (Inc.)
Lunkenheimer Co.

Lubricators, Cylinder
* Bowser, S. F. & Co. (Inc.)
Lunkenheimer Co.

Lubricators, Force-Feed
* Bowser, S. F. & Co. (Inc.)
Lunkenheimer Co.

Lubricators, Hydrostatic
* Crosby Steam Gage & Valve Co.
Lunkenheimer Co.

Lubricators (Sight Feed)
* Crosby Steam Gage & Valve Co.
Lunkenheimer Co.

Machine Tool Feed Control Systems (Oil Pressure)
* American Fluid Motors Co.

Machine Work
* Brown, A. & F. Co.
* Builders Iron Foundry
DuPont Engineering Co.
Farrel Foundry & Machine Co.
* Franklin Machine Co.
Hill Clutch Machine & Fdry. Co.
Johnson, Carlyle Machine Co.
* Jones, W. A. Fdry. & Mach. Co.
Lammert & Mann Co.
Link-Belt Co.
* Nordberg Mfg. Co.

Machinery
(Is classified under the headings descriptive of character thereof)

Manometers
* American Blower Co.
Bacharach Industrial Instrument Co.
* Simplex Valve & Meter Co.

Mechanical Draft Apparatus
* American Blower Co.
* Clarage Fan Co.
* Coppus Engineering Corp'n
* Green Fuel Economizer Co.
* Sturtevant, B. F. Co.

Mechanical Stokers
(See Stokers)

Metal Treating
* American Metal Treatment Co.

Metals, Perforated
* Hendrick Mfg. Co.

Meters, Air and Gas
Bacharach Industrial Instrument Co.
* Bailey Meter Co.
* Builders Iron Foundry
* General Electric Co.

Meters, Boiler Performance
* Bailey Meter Co.

Meters, Condensation
* Simplex Valve & Meter Co.

Meters, Electric
* General Electric Co.
* Westinghouse Electric & Mfg. Co.

Meters, Feed Water
* Bailey Meter Co.
* Builders Iron Foundry
* Cochrane Corp'n
* General Electric Co.
Hoppes Mfg. Co.
* Simplex Valve & Meter Co.
* Worthington Pump & Machinery Corp'n

Meters, Flow
Bacharach Industrial Instrument Co.
* Bailey Meter Co.
* Cochrane Corp'n
* General Electric Co.
* Simplex Valve & Meter Co.

Meters, Oil
* Bowser, S. F. & Co. (Inc.)
* Cochrane Corp'n
* General Electric Co.
* Simplex Valve & Meter Co.
* Worthington Pump & Machinery Corp'n

Meters, Pitot Tube
* American Blower Co.
* Simplex Valve & Meter Co.

Meters, Steam
* Bailey Meter Co.
* Builders Iron Foundry
* Cochrane Corp'n
* General Electric Co.

Meters, V-Notch
* Bailey Meter Co.
* Cochrane Corp'n
* General Electric Co.

Meters, Venturi
* Builders Iron Foundry
* National Meter Co.
* Simplex Valve & Meter Co.

Meters, Water
* Cochrane Corp'n
* General Electric Co.
Hoppes Mfg. Co.
* National Meter Co.
* Simplex Valve & Meter Co.
* Worthington Pump & Machinery Corp'n

Milling and Drilling Machines (Combined)
Universal Boring Machine Co.

Milling Machines, Hand
* Whitney Mfg. Co.

Milling Machines, Keyseat
* Whitney Mfg. Co.

Milling Machines, Plain
* Warner & Swasey Co.

Mills, Ball
* Allis-Chalmers Mfg. Co.
* Smidth, F. L. & Co.
* Worthington Pump & Machinery Corp'n

Mills, Blooming and Slabbing
Mackintosh-Hemphill Co.

Mills, Grinding
Farrel Foundry & Machine Co.
* Smidth, F. L. & Co.

Mills, Sheet and Plate
Mackintosh-Hemphill Co.

Mills, Structural, Rail and Bar
Mackintosh-Hemphill Co.

Mills, Tube
* Allis-Chalmers Mfg. Co.
* Smidth, F. L. & Co.
* Worthington Pump & Machinery Corp'n

Mining Machinery
* Allis-Chalmers Mfg. Co.
* General Electric Co.
* Ingersoll-Rand Co.
* Worthington Pump & Machinery Corp'n

Monel Metal
Driver-Harris Co.

Monorail Systems
(See Tramrail Systems, Overhead)

Motor-Generators
* Allis-Chalmers Mfg. Co.
* General Electric Co.
Ridgway Dynamo & Engine Co.
* Westinghouse Electric & Mfg. Co.

Motors, Electric
* Engberg's Electric & Mech. Wks.
* General Electric Co.
Master Electric Co.
Ridgway Dynamo & Engine Co.
* Sturtevant, B. F. Co.
* Westinghouse Electric & Mfg. Co.

Motors, Synchronous
Ridgway Dynamo & Engine Co.

Nickel, Sheet
Driver-Harris Co.

Nipple Threading Machines
* Landis Machine Co. (Inc.)

Nitrogen Gas
* Linde Air Products Co.

Nozzles, Blast
* Schutte & Koerting Co.

Nozzles, Sand and Air
Lunkenheimer Co.

Nozzles, Spray
* Cooling Tower Co. (Inc.)
* Schutte & Koerting Co.

Odometers
Veeder Mfg. Co.

Ohmeters
* General Electric Co.

Oil and Grease Cups
* Bowser, S. F. & Co. (Inc.)
* Crane Co.
Lunkenheimer Co.

Oil and Grease Guns
* Royersford Fdry. & Mach. Co.

Oil Burning Equipment
Bethlehem Shipbldg.Corp'n(Ltd.)
* Combustion Engineering Corp'n
* Schutte & Koerting Co.

Oil Filtering and Circulating Systems
* Bowser, S. F. & Co. (Inc.)

Oil Mill Machinery
* Worthington Pump & Machinery Corp'n

Oil Refinery Equipment
Bethlehem Shipbldg.Corp'n(Ltd.)
* Vogt, Henry Machine Co.

Oil Storage and Distributing Systems
* Bowser, S. F. & Co. (Inc.)

Oil Well Machinery
* Ingersoll-Rand Co.
* Titusville Iron Works Co.
* Worthington Pump & Machinery Corp'n

Oiling Devices
* Bowser, S. F. & Co. (Inc.)
Lunkenheimer Co.

Oiling Systems
* Bowser, S. F. & Co. (Inc.)
Lunkenheimer Co.

Oils, Lubricating
Vacuum Oil Co.

Ore Handling Machinery
* Brown Hoisting Machinery Co.
Chain Belt Co.
Link-Belt Co.

Ovens, Core
* Whiting Corporation

Oxy-Acetylene Supplies
* Linde Air Products Co.

Oxygen Gas
* Linde Air Products Co.

Packing, Ammonia
Garlock Packing Co.
* Goodrich, B. F. Rubber Co.
* United States Rubber Co.

Packing, Asbestos
Garlock Packing Co.
* Goodrich, B. F. Rubber Co.
Johns-Manville (Inc.)

Packing, Centrifugal Pump
Garlock Packing Co.

Packing, Hydraulic
Garlock Packing Co.
* Goodrich, B. F. Rubber Co.
Johns-Manville (Inc.)

Packing, Metallic
Garlock Packing Co.
Johns-Manville (Inc.)

Packing, Rod (Piston and Valve)
Garlock Packing Co.
* Goodrich, B. F. Rubber Co.
* Jenkins Bros.
Johns-Manville (Inc.)
* United States Rubber Co.

Packing, Rubber
Garlock Packing Co.
* Goodrich, B. F. Rubber Co.
* Jenkins Bros.
Johns-Manville (Inc.)
* United States Rubber Co.

Packing, Sheet
Garlock Packing Co.
* Goodrich, B. F. Rubber Co.
* Jenkins Bros.
Johns-Manville (Inc.)
* United States Rubber Co.

Paints, Concrete (For Industrial Purposes)
Smooth-On Mfg. Co.

Paint, Metal
* Dixon, Joseph Crucible Co.
* General Electric Co.
Johns-Manville (Inc.)

Panel Boards
* Westinghouse Elect. & Mfg. Co.

Paper, Drawing
Dietzgen, Eugene Co.
Keuffel & Esser Co.
New York Blue Print Paper Co.
ParVell Laboratories
U. S. Blue Co.
Weber, F. Co. (Inc.)

Paper, Sensitized
Dietzgen, Eugene Co.
Keuffel & Esser Co.
New York Blue Print Paper Co.
ParVell Laboratories
U. S. Blue Co.
Weber, F. Co. (Inc.)

*Catalogue data of firms marked * appear in the A.S.M.E. Condensed Catalogues of Mechanical Equipment, 1923-24 Volume*

Newfoundland. Newfoundland Water Power. Times Trade & Eng. Supp., vol. 14, no. 303, Apr. 26, 1924, p. 167, 3 figs. Progress being made in large scheme for production of hydroelectric power and manufacture of paper, known as Humberarm proposition, in west of Newfoundland; details of dam, pipe line and power house, and paper mill.

Sweden. Swedish Water Power and the Farmer. Elec. World, vol. 83, no. 20, May 17, 1924, pp. 992–998, 14 figs. 40 per cent of tilled land now within reach of electric transmission lines; standardized distribution system employed, which is partly financed by farmers' local coöperative societies.

Switzerland. Hydroelectric Development and Railway Electrification in Switzerland (Reiseeindrücke über Wasserkraftnutzung und Bahnelektrisierung in der Schweiz), P. Dittes. Elektrotechnik u. Maschinenbau, vol. 42, no. 12, Mar. 23, 1924, pp. 177–189, 21 figs. Describes more important hydroelectric plants and developments in railway electrification, including transmission lines, locomotives, etc.

HYDROELECTRIC PLANTS

Danube River, Germany. The First Hydroelectric Plant on the Danube River (Das erste Donaukraftwerk), W. Vieser. Zeit. des Oesterr. Ingenieur- u. Architekten-Vereines, vol. 76, no. 11–12, Mar. 21, 1924, pp. 91–94, 6 figs. The Rhine-Main-Danube as waterway for hydroelectric development; canalization of Danube by means of dam at Kachlet near Passau; description of plant, locks, weir, and power house; status of construction work.

Load Control. Load Control in Automatic Hydro-Electric Generating Stations, R. C. Denny. Power, vol. 59, no. 19, May 6, 1924, pp. 716–717, 3 figs. Float-control method of making load changes; load control where water storage is available.

Sand-Removal Plants. The Deterioration of Turbines and Automatic Sand-Removal Plants (Neues über Turbinen-Abnützungen und automatische Entsandungs-Anlagen), H. Dufour. Schweizerische Bauzeitung, vol. 83, nos. 15 and 17, Apr. 12 and 26, 1924, pp. 169–171 and 196–200, 16 figs. Cites examples to show that turbines, even in low-pressure works, suffer great deterioration from river detritus; and describes recent developments in automatic sand-removal plants.

I

ICE MANUFACTURE

Cracked- and Checked-Ice Problems. Solving "Cracked and Checked" Ice Problems, E. Ormsby. Power House, vol. 17, no. 7, Apr. 5, 1924, pp. 28–29 and 41, 3 figs. Outline of some remedies for difficulties confronting power plant engineers as a result of strains produced in freezing. Paper read before Nat. Assn. Practical Refrig. Engrs. annual convention. See also Southern Engr., vol. 41, no. 2, Apr. 1924, pp. 50–52.

ICE PLANTS

Huntingdon, Pa. Modern Ice Making and Icing Station at Huntingdon, Pa. Ice & Refrigeration, vol. 66, no. 4, Apr. 1924, pp. 283–290, 15 figs. Describes ice-making plant and car-icing station of Bolye Ice Co. recently completed; built for supplying ice for Fruit Growers' Express and Pennsylvania R. R. Co.

Oil-Engine-Driven. Ice Plants and the Question of Oil Engine Power, C. T. Baker. Oil Engine Power, vol. 11, no. 4, Apr. 1924, pp. 212 and 217–219, 2 figs. Deals with subject of oil-engine drive for ice plants, discussing cost of installation, maintenance and repair costs, fuel and lubricating costs, method of drive, etc. Extracts from paper read before Ga. Ice Assn.

INDUSTRIAL MANAGEMENT

Average Costs, Fallacy of. A Fallacy of Management—That Average Costs Are of Any Value, B. M. Maynard and J. Heywood. Factory, vol. 32, no. 3, Mar. 1924, pp. 330–331 and 366, 1 fig. Discussion based on varied experience with industrial engineering in many plants.

Development. A Decade's Development in Management, H. P. Kendall. Taylor Soc.—Bul., vol. 9, no. 2, Apr. 1924, pp. 55–56. Trends and results of scientific management; developments in manufacturing problems; industrial relations; scientific management and selling.

Executive Function. Management as an Executive Function, J. H. Williams. Taylor Soc.—Bul., vol. 9, no. 2, Apr. 1924, pp. 66–71. Emphasizes modern biology and psychology as essential to development of science of management.

Expense Control. A Method of Expense Control That Paid, M. R. Lott. Indus. Mgt. (N. Y.), vol. 67, no. 5, May 1924, pp. 284–286, 2 figs. Keeping down cost of improvements; describes method which has proved of great benefit in controlling cost of work of expense nature, where large sums are involved.

Increase of Production. (Menschenwirtschaft.) Increase of Production. Zeit. des Vereines deutscher Ingenieure, vol. 68, no. 17, Apr. 26, 1924, pp. 405–413, 30 figs. Discusses increase of production by increasing present efficiency of workmen, by harmonizing their operation with the machinery they employ, and by providing them with intelligent direction and supervising.

Machine-Building Industries. Management Problems in Machine Building Industries, E. F. Du Brul. Am. Mach., vol. 60, no. 20, May 15, 1924, pp. 717–721, 2 figs. Effect of business cycle on management policies; handicaps under which builder of production equipment must work; profits of fat years must cover losses suffered in lean ones.

Metal-Working Trades. The Mechanical Engineering of Management in the Metal-Working Trades, Robt. T. Kent. Mech. Eng., vol. 46, no. 5, May 1924, pp. 272–273 and 307. Good mechanical engineering is shown to be essential to good management in metal-working trades; engineering preliminaries to time study; engineering in plant; methods and equipment.

Principles. The Principles Underlying Good Management, H. Diemer. Indus. Mgt. (N. Y.), vol. 67, no. 5, May 1924, pp. 280–283. Investigation and standardization; comprehensive planning; preparation; inspection and records; wage incentives; control; mutual confidence and coöperation.

Production Control. A Workable Production Control Plan for the Small Plant, A. A. Dobson. Factory, vol. 32, no. 5, May 1924, pp. 652–654, 5 figs. Stock file of tickets are printed in addressing machine using metal plates; tickets required in system are stores issue, time ticket, job ticket, move ticket, and work tag.

Production Planning. A Flexible Method of Production Planning for the Job Shop, E. W. Palmer. Factory, vol. 32, no. 3, Mar. 1924, pp. 321–324, 392 and 394, 5 figs. Method devised by author's own organization.

Sales. Tendencies in Sales Management, S. Cowan. Taylor Soc.—Bul., vol. 9, no. 2, Apr. 1924, pp. 72–85. Consideration of influence of scientific-management attitude of mind on selling and advertising; scientific analysis of marketing problems; scientific planning of sales activities; executive responsibility.

Simplification. A Bibliography of Articles on Simplification. Factory, vol. 32, no. 3, Mar. 1924, pp. 318–320. Classified list of periodical articles, government reports and special reports.

Tool-Division System. Tool Division Organization and Management, E. C. Cooley. Machy. (N. Y.), vol. 30, no. 9, May 1924, p. 700. Deals with essential points to be considered in developing tool-division system; system successfully employed in number of shops engaged in interchangeable manufacture; making and upkeep of tools; controlling head.

INDUSTRIAL ORGANIZATION

Automobile Manufacturing Plant. Organizing a Great Industrial, C. S. Scott. Mgt. & Administration, vol. 7, no. 5, May 1924, pp. 523–527, 1 fig. Organization methods of General Motors corporation.

Employers' Associations. Some Tendencies of Employers' Organisations in 1923. Int. Labour Rev., vol. 9, no. 2, Feb. 1924, pp. 208–226. Outstanding tendencies of employers' associations during 12-month period ending in autumn of 1923.

Vertical Trusts. The Vertical Trust, D. T. Farnham. Indus. Mgt. (N. Y.), vol. 67, no. 5, May 1924, pp. 257–263, 4 figs. Newer form of industrial combination and what it portends; its advantages and limitations and place in present industrial order.

INTERCHANGEABLE MANUFACTURE

Munitions. Interchangeable Manufacture and Munitions, E. Buckingham. Army Ordnance, vol. 4, no. 24, May-June, 1924 pp. 361–366, 1 fig. Traces briefly progress of a commodity through all stages of its manufacture, from its inception as a mechanical project to final testing that determines its successful completion.

INTERNAL-COMBUSTION ENGINES

Air Consumption and Power. Air Consumption and Power of Petrol Engines, H. Moss. Engineering, vol. 117, no. 3042, Apr. 18, 1924, pp. 507–509, 5 figs. Relationship of air consumption of brake horsepower in internal-combustion engines; road and flight tests. (Abstract.) Paper read before Instn. Mech. Engrs.

Balancing of Masses. Balancing of Masses in Single-Crank, Single- and Double-Cylinder Internal-Combustion Engines (Massenausgleich bei einkurbeligen, ein- und zweizylindrigen Verbrennungsmotoren), H. Schrön. Motorwagen, vol. 27, nos. 8 and 10, Mar. 20 and Apr. 10, 1924, pp. 127–134 and 166–174, 35 figs. Numerical and graphical presentation of paths of center of gravity, free forces and moments exerted by masses with one cylinder and two cylinders in fork and end-to-end arrangement, when no counterweight is present and when rotating masses are balanced; determination of additional weight for further improvement of weight; numerical examples.

Efficiency Standards. Efficiency Standards for Internal Combustion Engines. Engineer, vol. 137, no. 3563, Apr. 11, 1924, p. 394. Discussion by Committee on Tabulating Results of Heat Engine and Boiler Trials on standards of comparison for thermal efficiency of internal-combustion engines. See also Shipbldg. & Shipg. Rec., vol. 23, no. 15, Apr. 10, 1924, pp. 426–427.

Exhaust-Valve Temperatures. Exhaust-Valve and Cylinder-Head Temperatures in High-Speed Petrol Engines, A. H. Gibson and H. W. Baker. Instn. Mech. Engrs.—Proc., vol. 2, no. 6, 1923, pp. 1045–1092 and (discussion) 1093–1119, 31 figs. Investigation shows that, in well-designed overhead-valve engine, either of air- or water-cooled type, under normal conditions of operation, temperature of exhaust valve may be between 600 and 750 deg. cent.; best shape of valve head appears to be one having flat bottom and tulip-shaped top, but as this is impracticable owing to weight, next best is one having tulip-shaped head common in airplane-engine practice; conditions tending to give hot valve also tend to give hot cylinder head.

Flywheel Design, Chart for. Finding the Flywheel Weight Required by an Internal-Combustion Engine, P. H. Schweitzer. Power, vol. 59, no. 18, Apr. 29, 1924, p. 673, 1 fig. Presents chart for flywheel design including full instructions as to steps to be followed when using chart.

High-Speed Four-Cycle. On Increasing the Size of the Gas Passages in High-Speed Four-Cycle Engines (Dell'ingrandimento delle luci di passagio dei gas nel motore veloce a quattro tempi), P. Tedeschi. Industria, vol. 38, no. 5, Mar. 15, 1924, pp. 133–136, 4 figs. Cylinder and valve arrangement and proportions by means of which area of gas passages is always 50 per cent, power output markedly increased, and efficiency improved.

Thermal Efficiency of. Standards of Comparison in Connection with the Thermal Efficiency of Internal Combustion Engines, G. J. Wells. Gas Jl., vol. 166, no. 3179, Apr. 16, 1924, pp. 172–175, 4 figs. Traces investigation of subject from commencement of work of original committee appointed by Instn. Civil Engrs. in 1903, to which reference is made to compute ideal efficiency. Standard recommended involves use of air as ideal fluid, together with hypothesis that its specific heat was constant over range of pressures and temperatures involved. See also Gas Wld., vol. 80, no. 2073, Apr. 12, 1924, pp. 338–339.

[See also AIRPLANE ENGINES; AUTOMOBILE ENGINES; DIESEL ENGINES; GAS ENGINES; MOTOR BUSES; OIL ENGINES.]

IRON

Cold Work, Effect of. The Effect of Cold-Work upon the Density of Crystals of α-Iron, H. O'Neill. Iron & Steel Inst.—advance paper, no. 13, for mtg. May 1924, 12 pp., 4 figs. Tests on Armco iron and on single crystal; results.

Deterioration from Rolling Friction. Testing the Deterioration of Iron and Steel from Rolling Friction without Application of Lubricants (Ueber die Prüfung der Abnutzung von Eisen und Stahl bei rollender Reibung ohne Schmiermittel), H. Meyer and F. Nehl. Stahl u. Eisen, vol. 44, no. 17, Apr. 24, 1924, pp. 457–464, 25 figs. Different kinds of deterioration and their testing; wear through rolling friction and its practical importance; method of testing; process of deterioration; testing deterioration of different kinds of hard iron; change in structure through process of deterioration; influence of increased pressure and structure-changing heat treatment; zone of segregation and direction of grain.

Wrought, Nick-Bend Test for. The Nick-Bend Test for Wrought Iron, H. S. Rawdon and S. Epstein. U. S. Bur. Standards, Technologic Papers, No. 252, Feb. 29, 1924, pp. 115–155, 23 figs. Details of and results obtained from investigation which consisted of fracturing, under different conditions, of nicked bars of a number of grades of wrought iron, and study of character of fracture.

IRON ALLOYS

Preparation and Properties. Preparation and Properties of Pure Iron Alloys, J. F. T. Berliner. U. S. Bur. Standards, Scientific Papers, No. 484, Mar. 5, 1924, pp. 347–356, 4 figs. Determination of critical ranges of pure iron-carbon alloys by thermoelectric method.

IRON, PIG

Characteristics and Uses. Pig-Iron: Its Characteristics and Uses, H. Field. Foundry Trade Jl., vol. 29, no. 402, May 1, 1924, pp. 353–358, 1 fig. Elementary paper having the object to help foundry worker understand why there are "brands" of iron, why one brand is preferred to another, why pig-iron should be carried the length and breadth of the country, and why various castings in foundry are cast from different mixtures.

Pig Casting Machine. La Follette Improvements. Iron Age, vol. 113, no. 19, May 8, 1924, p. 1353. Single-strand pig-iron casting machine installed at blast furnace; improvements to other departments.

Pig Casting Machine Replaces Sand Bed. Iron Trade Rev., vol. 74, no. 21, May 22, 1924, pp. 1368–1369, 2 figs. LaFollette Coal & Iron Co., LaFollette, Tenn., has discontinued use of sand beds and placed in operation single-strand pig machine.

Oxygen in. Oxygen in Pig Iron (Några tankar om syre i tackjärn), J. A. Leffler. Jernkontorets Annaler, vol. 108, no. 3, 1924, pp. 149–177, 4 figs. Superiority of charcoal as a deoxidizer is claimed to be one of the main reasons for superiority of charcoal iron over coke iron. Analyses of Swedish charcoal iron as compared to German and English coke iron show also the very low contents of sulphur and phosphor of charcoal iron as compared to the much higher contents of these elements in coke iron.

J

JOINTS

Soft-Soldered. Some Properties of Soft Soldered Joints, T. B. Crow. Chem. & Industry, vol. 43, nos. 12 and 13, Mar. 21 and 28, 1924, pp. 65T-68T and 69T-70T, 15 figs. Points out that tensile strength of joints increases with diminution of thickness of solder film in joint; tensile strength of all joints was less that yield point of copper, but strongest joint had tensile strength of $2^1/_2$ times that of solder; action of zinc chloride is to prevent oxidation by preventing access of oxygen; it has no electrochemical action.

L

LATHES

Elliptic-Turning Attachment. Lathe Attachment for Elliptic Turning, I. F. Yeoman. Machy. (N. Y.), vol. 30, no. 9, May 1924, pp. 677–678, 5 figs. Describes attachment primarily employed for elliptical-turning operations on punches and dies used in making

Manufactured by Advertisers — CLASSIFIED LIST OF MECHANICAL EQUIPMENT — Alphabetical List on page 152

Paper Mill Machinery
Farrel Foundry & Machine Co.

Paraffine Wax Plant Equipment
Bethlehem Shipbldg.Corp'n(Ltd.)
* Vogt, Henry Machine Co.

Pasteurizers
* Vilter Mfg. Co.

Pattern Work
DuPont Engineering Co.

Pencils, Drawing
American Lead Pencil Co.
Dietzgen, Eugene Co.
* Dixon, Joseph Crucible Co.
Keuffel & Esser Co.
New York Blue Print Paper Co.
ParVell Laboratories
U. S. Blue Co.
Weber, F. Co. (Inc.)

Penstocks
Smith, S. Morgan Co.

Pile Drivers
Clyde Iron Works Sales Co.
Lidgerwood Mfg. Co.

Pinions, Rolling Mill
* Foote Bros. Gear & Machine Co.
Mackintosh-Hemphill Co.

Pinions, Steel
* Foote Bros. Gear & Machine Co.
* General Electric Co.

Pipe, Brass and Copper
* Wheeler Condenser & Engrg. Co.

Pipe, Cast Iron
* Builders Iron Foundry
* Central Foundry Co.
* U. S. Cast Iron Pipe & Fdry. Co.

Pipe, Riveted
* American Spiral Pipe Wks.
* Springfield Boiler Co.
Steere Engineering Co.
* Titusville Iron Works Co.
* Walsh & Weidner Boiler Co.

Pipe, Soil
* Central Foundry Co.

Pipe, Steel
* Crane Co.
Steere Engineering Co.

Pipe, Welded
* American Spiral Pipe Wks.
* Crane Co.
* Pittsburgh Valve, Fdry. & Const. Co.
Steere Engineering Co.

Pipe, Wrought Iron
Byers, A. M. Company
* Crane Co.

Pipe Coils, Covering, Fittings, etc.
(See Coils, Covering, Fittings, etc., Pipe)

Pipe Cutting and Threading Machines
* Crane Co.
* Landis Machine Co. (Inc.)

Pipe Threading Machines
Treadwell Engineering Co.

Piping, Ammonia
* Frick Co. (Inc.)

Piping, Power
* Crane Co.
* Pittsburgh Valve, Fdry. & Const. Co.
Steere Engineering Co.
* Vogt, Henry Machine Co.

Pitot Tubes
(See Tubes, Pitot)

Planimeters
* American Schaeffer & Budenberg Corp'n
* Bristol Co.
* Crosby Steam Gage & Valve Co.
Dietzgen, Eugene Co.
Keuffel & Esser Co.
New York Blue Print Paper Co.
ParVell Laboratories
U. S. Blue Co.
Weber, F. Co. (Inc.)

Plate Metal Work
(See Steel Plate Construction)

Pointers, Bolt
* Landis Machine Co. (Inc.)

Polishing Machinery
* Builders Iron Foundry
* Royersford Fdry. & Mach. Co.

Powdered Fuel Equipment (for Boiler and Metallurgical Furnaces)
* Allis-Chalmers Mfg. Co.
* Combustion Engineering Corp'n
Grindle Fuel Equipment Co.
* Quigley Furnace Specialties Co.
* Smidth, F. L. & Co.
* Worthington Pump & Machinery Corp'n

Power Transmission Machinery
* Allis-Chalmers Mfg. Co.
* Brown, A. & F. Co.
Chain Belt Co.
* Diamond Chain & Mfg. Co.
* Falls Clutch & Machinery Co.
Farrel Foundry & Machine Co.
* Foote Bros. Gear & Machine Co.
* Franklin Machine Co.
* General Electric Co.
Hill Clutch Machine & Fdry. Co.
* Hyatt Roller Bearing Co.
* Jones, W. A. Fdry. & Mach. Co.
Link-Belt Co.
* Medart Co.
* Morse Chain Co.
Palmer-Bee Co.
* Royersford Fdry. & Mach. Co.
* Smidth, F. L. & Co.
Smith, S. Morgan Co.
* Woods, T. B. Sons Co.

Preheaters, Air
* Combustion Engineering Corp'n
Prat-Daniel Corporation

Presses, Baling
* Franklin Machine Co.

Presses, Draw
* Niagara Machine & Tool Works

Presses, Extruding
Farrel Foundry & Machine Co.

Presses, Foot
* Royersford Fdry. & Mach. Co.

Presses, Forming
Farrel Foundry & Machine Co.

Presses, Hydraulic
* Falls Clutch & Machinery Co.
Farrel Foundry & Machine Co.
Mackintosh-Hemphill Co.

Presses, Punching and Trimming
Long & Allstatter Co.
* Niagara Machine & Tool Works
* Royersford Fdry. & Mach. Co.

Presses, Sheet Metal Working
* Niagara Machine & Tool Works

Presses, Toggle
* Niagara Machine & Tool Works

Presses, Wax
* Vogt, Henry Machine Co.

Pressure Gages, Regulators, etc.
(See Gages, Regulators, etc., Pressure)

Producers, Gas
* De La Vergne Machine Co.
* Westinghouse Electric & Mfg. Co.
* Worthington Pump & Mchry. Corp'n

Projectors, Flood Lighting
* Westinghouse Elect. & Mfg. Co.

Propellers
* Morris Machine Works

Pulleys, Friction Clutch
* Allis-Chalmers Mfg. Co.
* Brown, A. & F. Co.
* Falls Clutch & Machinery Co.
Hill Clutch Machine & Fdry. Co.
Johnson, Carlyle Machine Co.
* Jones, W. A. Fdry. & Mach. Co.
Link-Belt Co.
* Medart Co.
* Wood's, T. B. Sons Co.

Pulleys, Iron
* Brown, A. & F. Co.
Chain Belt Co.
* Falls Clutch & Machinery Co.
* Gifford-Wood Co.
Hill Clutch Machine & Fdry. Co.
* Jones, W. A. Fdry. & Mach. Co.
Link-Belt Co.
* Medart Co.
* Wood's, T. B. Sons Co.

Pulleys, Steel
* Medart Co.

Pulleys, Wood
* Medart Co.

Pulverizers
* Brown, A. & F. Co.
* Smidth, F. L. & Co.

Pulverizers, Cement Materials
Pennsylvania Crusher Co.

Pulverizers, Coal
* Furnace Engineering Co.
Grindle Fuel Equipment Co.
Pennsylvania Crusher Co.

Pulverizers, Limestone
Pennsylvania Crusher Co.

Pump Governors, Valves, etc.
(See Governors, Valves, etc. Pump)

Pumping Engines
(See Engines, Pumping)

Pumping Systems, Air Lift
* Ingersoll-Rand Co.

Pumps, Acid
Buffalo Steam Pump Co.
* Ingersoll-Rand Co.
* Nordberg Mfg. Co.
Taber Pump Co.
* Titusville Iron Works Co.

Pumps, Air
* Goulds Mfg. Co.
* Ingersoll-Rand Co.
* Westinghouse Electric & Mfg. Co.
* Wheeler, C. H. Mfg. Co.

Pumps, Ammonia
Buffalo Steam Pump Co.
* Goulds Mfg. Co.
* Ingersoll-Rand Co.
* Vogt, Henry Machine Co.
* Worthington Pump & Machinery Corp'n

Pumps, Boiler Feed
* Allis-Chalmers Mfg. Co.
Bethlehem Shipbldg.Corp'n(Ltd.)
Buffalo Steam Pump Co.
* Coppus Engineering Corp'n
* De Laval Steam Turbine Co.
* Goulds Mfg. Co.
* Ingersoll-Rand Co.
* Kerr Turbine Co.
* Wheeler, C. H. Mfg. Co.
* Worthington Pump & Machinery Corp'n

Pumps, Centrifugal
* Allis-Chalmers Mfg. Co.
Bethlehem Shipbldg.Corp'n(Ltd.)
Buffalo Steam Pump Co.
* Cramp, Wm. & Sons Ship & Engine Bldg. Co.
* DeLaval Steam Turbine Co.
* Goulds Mfg. Co.
* Ingersoll-Rand Co.
* Kerr Turbine Co.
Lammert & Mann Co.
* Morris Machine Works
* Nordberg Mfg. Co.
Taber Pump Co.
* Westinghouse Electric & Mfg. Co.
* Wheeler, C. H. Mfg. Co.
* Wheeler Cond. & Engrg. Co.
* Worthington Pump & Machinery Corp'n

Pumps, Condensation
Buffalo Steam Pump Co.
* Ingersoll-Rand Co.
* Wheeler, C. H. Mfg. Co.

Pumps, Deep Well
* Allis-Chalmers Mfg. Co.
* Goulds Mfg. Co.
* Ingersoll-Rand Co.
* Morris Machine Works
* Worthington Pump & Machinery Corp'n

Pumps, Dredging
* Ingersoll Rand Co.
* Morris Machine Works
* Worthington Pump & Machinery Corp'n

Pumps, Electric
* Allis-Chalmers Mfg. Co.
Buffalo Steam Pump Co.
* Goulds Mfg. Co.
* Ingersoll-Rand Co.
* Morris Machine Works
* Nordberg Mfg. Co.
Taber Pump Co.
* Worthington Pump & Machinery Corp'n

Pumps, Elevator
Buffalo Steam Pump Co.
* Goulds Mfg. Co.
* Worthington Pump & Machinery Corp'n

Pumps, Filter Press
Buffalo Steam Pump Co.
* Goulds Mfg. Co.

Pumps, Hand
* Goulds Mfg. Co.
Taber Pump Co.

Pumps, Hydraulic
* American Fluid Motors Co.
Farrel Foundry & Machine Co.

Pumps, Hydraulic Pressure
Bethlehem Shipbldg.Corp'n(Ltd.)
Buffalo Steam Pump Co.
* Goulds Mfg. Co.
* Ingersoll-Rand Co.
* Morris Machine Works
* Worthington Pump & Machinery Corp'n

Pumps, Measuring
Wayne Tank & Pump Co.

Pumps, Measuring (Gasoline or Oil)
* Bowser, S. F. & Co. (Inc.)

Pumps, Oil
Bethlehem Shipbldg.Corp'n(Ltd.)
* Bowser, S. F. & Co. (Inc.)
Buffalo Steam Pump Co.
* Goulds Mfg. Co.
* Ingersoll-Rand Co.
Lunkenheimer Co.
Taber Pump Co.
* Worthington Pump & Machinery Corp'n

Pumps, Oil, Force-Feed
Bethlehem Shipbldg.Corp'n(Ltd.)
* Bowser, S. F. & Co. (Inc.)
* Goulds Mfg. Co.
Lunkenheimer Co.

Pumps, Oil (Hand)
* Bowser, S. F. & Co. (Inc.)
* Goulds Mfg. Co.
Lunkenheimer Co.

Pumps, Power
* Allis-Chalmers Mfg. Co.
Bethlehem Shipbldg.Corp'n(Ltd.)
Buffalo Steam Pump Co.
* Goulds Mfg. Co.
* Ingersoll-Rand Co.
* Nordberg Mfg. Co.
* Wheeler Cond. & Engrg. Co.
* Worthington Pump & Machinery Corp'n

Pumps, Rotary
Fletcher Works
* Goulds Mfg. Co.
Lammert & Mann Co.
Taber Pump Co.

Pumps, Steam
* Allis-Chalmers Mfg. Co.
Buffalo Steam Pump Co.
* Ingersoll-Rand Co.
* Nordberg Mfg. Co.
* Wheeler, C. H. Mfg. Co.
* Wheeler Cond. & Engrg. Co.
* Worthington Pump & Machinery Corp'n

Pumps, Sugar House
* Allis-Chalmers Mfg. Co.
Buffalo Steam Pump Co.
* Goulds Mfg. Co.
* Ingersoll-Rand Co.
* Worthington Pump & Machinery Corp'n

Pumps, Sump
Buffalo Steam Pump Co.
* Goulds Mfg. Co.
* Ingersoll-Rand Co.
* Morris Machine Works
* Smidth, F. L. & Co.
Taber Pump Co.

Pumps, Tank
Buffalo Steam Pump Co.
* Goulds Mfg. Co.
* Ingersoll-Rand Co.
Taber Pump Co.
* Wheeler, C. H. Mfg. Co.
* Wheeler Cond. & Engrg. Co.
* Worthington Pump & Machinery Corp'n

Pumps, Turbine
* Allis-Chalmers Mfg. Co.
Buffalo Steam Pump Co.
* De Laval Steam Turbine Co.
* General Electric Co.
* Goulds Mfg. Co.
* Ingersoll-Rand Co.
* Kerr Turbine Co.
* Morris Machine Works
* Westinghouse Electric & Mfg. Co.
* Worthington Pump & Machinery Corp'n

Pumps, Vacuum
Buffalo Steam Pump Co.
* Croll-Reynolds Engrg. Co. (Inc.)
Fletcher Works
* Goulds Mfg. Co.
* Ingersoll-Rand Co.
Lammert & Mann Co.
* Nordberg Mfg. Co.
* Wheeler, C. H. Mfg. Co.
* Wheeler Cond. & Engrg. Co.
* Worthington Pump & Machinery Corp'n

Punches, Multiple
* Long & Allstatter Co.
Mackintosh-Hemphill Co.

Punches, Power
* Niagara Machine & Tool Works
* Royersford Fdry. & Mach. Co.

Punches and Dies
* Royersford Fdry. & Mach. Co.

Punching and Coping Machines
* Long & Allstatter Co.

Punching and Shearing Machines
* Long & Allstatter Co.
* Royersford Fdry. & Mach. Co.

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* Frick Co. (Inc.)

Purifiers, Oil
* Bowser, S. F. & Co. (Inc.)
Elliott Co.

Purifying and Softening Systems, Water
International Filter Co.
* Scaife, Wm. B. & Sons Co.

*Catalogue data of firms marked * appear in the A.S.M.E. Condensed Catalogues of Mechanical Equipment, 1923-24 Volume*

oval or elliptical frames for retaining glass windows in automobile tops.

Screw-Cutting. Production of a 4-inch Screw-cutting Lathe. Machy. (Lond.), vol. 24, no. 601, Apr. 3, 1924, pp. 11–14, 9 figs. Practice of Britannia Lathe & Oil Engine Co., Colchester.

Turret. Chucking Work on Turret Lathes (Wirtschaftliche Ausführung von Futterarbeiten auf Revolverdrehbänken), A. Figge. Maschinenbau, vol. 3, no. 12, Mar. 27, 1924, pp. 396–397, 5 figs. Advantages of multiple-hole turret lathe with horizontal revolving head in regard to simplicity and convenient adjustment of tools.

LIGNITE

Carbonization. Lignite Carbonization, W. W. Odell. U. S. Bur. Mines, Reports of Investigations, No. 2569, Feb. 1924, 6 pp. Figures showing what proportion of fuel requirements of Northwest is industrial or domestic fuel, and what proportion of lignite consumed is used for domestic purposes; notes on carbonization products; briquetting raw lignite.

Low-Temperature Carbonization, Particularly of Lignites (La carbonisation à basse température, en particulier celle des lignites), C. Berthelot. Société d'Encouragement pour l'Industrie Nationale—Bul., vol. 123, no. 1, Jan. 1924, pp. 44–66, 9 figs. Definition and realization of low-temperature carbonization, and its practical importance in metallurgical-coke industry; low-temperature carbonization of lignite.

Distillation, Furnaces for. Historical Development of the Rolle Furnace Up to the Present Time (Die geschichltiche Entwicklung des Rolle-Ofens bis zur Neuzeit), A. Thau. Braunkohle, vol. 23, no. 2, Apr. 12, 1924, pp. 17–32, 30 figs. on supp. plates. Development of these furnaces, which serve the purpose of distilling lignite, extends over three-quarters of a century. Rolle's designs, of which a large number are illustrated and described, have not been materially improved upon by later designers.

LOCOMOTIVE BOILERS

Fireboxes. Making Four-piece Mallet Fireboxes, J. A. Doarnberger. Boiler Maker, vol. 24, no. 4, Apr. 1924, pp. 101–104, 9 figs. Methods used in construction of fireboxes for 2–6–6–2 heavy Mallet locomotives for freight service on Norfolk & Western Lines.

Manufacture. Building Locomotive Boilers. Eng. Production, vol. 7, no. 139, Apr. 1924, pp. 105–110, 16 figs. Procedure at works of Great Western Ry. Co. at Swindon, Eng.

Paying Weight. The Paying Weight in Locomotive Boilers, C. A. Seley. Ry. Age, vol. 76, no. 24, May 17, 1924, pp. 1216–1218, 1 fig. Firebox heating surface about twice as effective as tubes and flues per lb. of material.

Repair Shop. A Modern Locomotive Boiler Reconditioning Shop, Alsace-Lorraine Railway, J. T. Burton-Alexander. Engineer, vol. 137, no. 3564, Apr. 18, 1924, pp. 404–407, 13 figs. partly on p. 414. Details of boiler shop erected since war at Strasburg; installation for repair of tubes.

LOCOMOTIVES

Bombay, Baroda & Central India Ry. New Express and Freight Locomotives, Bombay, Baroda & Central India Railway. Ry. Engr., vol. 45, no. 532, May 1924, pp. 170 and 178. Particulars of 4–6–2-type express passenger and 2–8–2-type freight locomotives; tractive force at 90 per cent of boiler pressure, 28,823 lb.

Diesel-Electric. Diesel-Electric Locomotive for Tunis Railway (Locomotive Diesel Electrique en Service en Tunisie), R. Debize. Revue Générale des Chemins de Fer & des Tramways, vol. 43, no. 3, Mar. 1924, pp. 172–180, 8 figs. Details of locomotive supplied by Diesel-Elektriska Vagn-Aktiebolaget, Sweden; consists of rigid frame mounted on two trucks, each equipped with two axles; a heavy-oil Diesel engine is mounted on frame which is direct coupled to generator.

Dimensions Comparison. The Comparison of Locomotive Dimensions, E. C. Poultney. Ry. Engr., vol. 45, no. 528, Jan. 1924, pp. 19–21 and 35. Discusses factors which it is necessary to consider when a general opinion is to be formed as to comparative capacity of any given locomotive. Locomotive power definitions.

Electric. See ELECTRIC LOCOMOTIVES.

Garratt Articulated. Garratt Articulated Locomotives. Times Trade & Eng. Supp., vol. 14, no. 304, May 3, 1924, p. 191, 1 fig. Fundamental principle governing design is provision of engine combining great flexibility with comparatively high power, and affording possibility of large boiler dimensions; first of its kind to be used in England, recently delivered by Beyer, Peacock & Co.

German. Modern Locomotives of the German State Railway (Neuere Lokomotiven der Deutschen Reichsbahn), F. Meineke. Zeit. des Vereines deutscher Ingenieure, vol. 68, no. 12, Mar. 22, 1924, pp. 273–276, 7 figs. Describes four new types; features that these locomotives have in common are large grates, bar frames and free axles; critical discussion and method of calculating superheater and frame.

Internal-Combustion. Mountain Trains with Internal-Combustion Locomotives (Bergbahnen mit Motorbetrieb), W. Müller. Motorwagen, vol. 27, no. 11, Apr. 20, 1924, pp. 186–190, 6 figs. Describes system recommended by author for rack railway in the Bavarian Alps, consisting of trains with internal-combustion locomotives in place of steam or electric locomotives.

Long Runs. Long Locomotive Runs, F. E. Russell Pacific Ry. Club—Proc., vol. 7, no. 12, Mar. 1924, pp. 9, 11, 13, 15 and 17–27, and (discussion) 27–39. Traces briefly development of steam locomotive in past 100 years. Shows that there is ample opportunity for improvement by obtaining greater mileage out of locomotives by increasing length of locomotive runs; gives list of 34 railways that have increased locomotive runs. Modern appliances and improvements in design and material that contribute to making long locomotive runs economical.

Lubrication. Locomotive Valve and Cylinder Lubrication, W. J. Schlacks. Ry. & Locomotive Eng., vol. 37, no. 5, May 1924, pp. 148–150, 1 fig. Schlacks force-feed lubricator; valve and cylinder lubrication of superheater locomotives.

0-8-0 Heavy Switch. New 0-8-0 Heavy Switch Engines for Wabash Ry. Ry. Rev., vol. 74, no. 19, May 10, 1924, pp. 833–838, 8 figs. Modern switch engines for use in yard and transfer service at large terminals.

Repairing. A Record in Completing Class III Repairs. Ry. Rev., vol. 74, no. 16, Apr. 19, 1924, pp. 713–715, 12 figs. Time record for making class III locomotive repairs was established on Kansas City Southern Ry., Mar. 17, 1924, when locomotive No. 556 was put through shops at Pittsburg, Kan., in 7 hr. and 55 min. Describes manner in which work was planned, preparations made beforehand, and schedule on which it was executed.

French Shipyard Repairs American Locomotives, G. L. Carden. Ry. Age, vol. 76, no. 22, May 3, 1924, pp. 1106–1107, 4 figs. Engines formerly used by U. S. A. are being equipped with copper fireboxes at Penhoët shipyards at St. Nazaire and Nantes.

Switching. A New Internal-Combustion Shunting Locomotive. Ry. Gaz., vol. 40, no. 16, Apr. 18, 1924, pp. 572–574, 6 figs. Particulars of the Vermont, gasoline-driven locomotive or tractor, designed to meet requirements of railway companies and industrial concerns; design based on simplicity of detail and economical operation.

Tests. Locomotive Tests on the Great Western Railway. Ry. Gaz., vol. 40, no. 18, May 2, 1924, pp. 637–642, 9 figs. Trials recently carried cut between Swindon and Plymouth and vice versa with new 4-cylinder 4–6–0-type express locomotive, no. 4074, "Caldicot Castle," to obtain detailed information as to performance of locomotives of "Castle" class.

Tire Practice. Locomotive Tire Practice on the Santa Fé, F. H. Colvin. Am. Mach., vol. 60, no. 19, May 8, 1924, pp. 697–698, 6 figs. Wheel gages and calipers, and how they are used; mating of tires by carbon content as well as size; standard shims; shrinkage allowance.

Turbo-Electric. The Ramsay Turbo-Electric Condensing Locomotive. Ry. Engr., vol. 45, no. 528, Jan. 1924, pp. 5–10 and 24, 11 figs. partly on supp. plates. Discusses developing and transmitting power, design of condenser, driving motors, speed regulation, and gives results of tests made on Lond. Midland & Scottish Ry. subsequent to modification of certain details, showing possibilities of this class of locomotive for working main-line passenger traffic.

LUBRICANTS

Specifications and Testing Methods. United States Government Specification for Lubricants and Liquid Fuels and Methods for Testing. U. S. Bur. Mines, Technical Paper 323A, 1924, 89 pp., 21 figs. Specification officially adopted by Federal Specifications Board Feb. 3, 1922, for use of departments and independent establishemnts of government in purchase of materials covered by it.

Rolling Stock. Lubricating Materials Used by the Russian Railroads, A. V. Sapoznikow. Petroleum & Oil-Shale Industry, vol. 5, no. 7–8, July-Aug. 1923, pp. 75–80. (In Russian.) See also article by A. K. Saytzeff, entitled Railway Car Oils and Lubricating Mixtures, Their Properties, Mechanical Tests, Valuation and Selection, pp. 81–92, 4 figs., with abstract in English, pp. 92–94.

LUBRICATION

Methods. Methods for Applying Lubricants. Power Plant Eng., vol. 28, no. 10, May 15, 1924, pp. 560–562, 8 figs. Drop-feed method of lubrication; gravity circulation of oil; methods of purifying oil; methods of using purifiers.

M

MACHINE SHOPS

Drafting-Room Management. A Practical Drafting-room System, I. B. Black. Machy. (N. Y.), vol. 30, nos. 8 and 9, Apr. and May 1924, pp. 605–607 and 671–673, 9 figs. Description of methods successfully applied in management of a drafting room.

MACHINE TOOLS

Attachments for. Attachments for Standard Machines, A. A. Dowd. Machy. (N. Y.), vol. 30, no. 9, May 1924, pp. 711–712, 4 figs. Important points in design; types of flexible designs.

Early Forms and Progress. The Master Tools of Industry, D. S. Kimball. Am. Mach., vol. 60, nos. 19 and 20, May 1 and 15, 1924, pp. 679–683 and 723–727, 27 figs. Early attempt of man to supplement his bodily efforts; principle of transfer of skill; modern machines and transfer of thought. Henry Maudsley and his enduring contribution to lathe design; beginnings of interchangeable manufacture; semi-automatic machine; Spencer and full automatic machine.

Tables. Work-holding Surfaces of Machine Tools. Machy. (Lond.), vol. 24, no. 605, May 1, 1924, pp. 132–137, 20 figs. Table design for different types of machines.

MACHINERY

Manufacture, Size Control in. Workmanship—The New Direct System of Size Control, P. J. Darlington. Sibley Jl. of Eng., vol. 38, no. 4, Apr. 1924, pp. 92–96. Describes new microgage system of production measurement, or size control, in which precision made available by Bur. Standards, and represented in cylindrical standard, is directly transferred to part being produced by means of a new automatic measuring comparator called "microgage."

MANGANESE STEEL

Silico. The Hardening of Silico-Manganese Steel, E. W. Colbeck and D. Hanson. Iron & Steel Inst.—advance paper, no. 5, for mtg. May 1924, 18 pp., 26 figs. Experiments show that temperatures required for complete hardening of steels used are very much higher than corresponding hardening temperatures for straight carbon steels having same carbon content.

MATERIALS HANDLING

Cake Bakery. Conveying under Difficulties in a Cake Bakery, G. F. Zimmer. Indus. Mgt. (Lond.), vol. 11, no. 7, Apr. 3, 1924, pp. 189–192, 4 figs. Satisfactory solution of difficult problem of installing conveying plant at cake bakery of Kearley & Tonge, Ltd., which was laid out in a way which rendered adoption of handling plant most difficult.

Cost-Saving Methods. Materials Handling Methods That Have Added to Industrial Profits, Geo. E. Hagemann. Mgt. & Administration, vol. 7, no. 5, May 1924, pp. 557–562, 1 fig. Experience data from 55 plants using larger equipment.

Equipment. Improvements in Transportation Engineering (Allgemeine Fortschritte auf dem Gebiete der Transporttechnik), C. Michenfelder. Praktische Maschinen-Konstrukteur, vol. 57, no. 8, Mar. 1, 1924, pp. 77–79, 6 figs. Describes latest designs of electric industrial trucks, electric cranes and conveyors.

Measuring the Savings of Mechanical Handling, W. T. Spivey. Mgt. & Administration, vol. 7, no. 5, May 1924, pp. 551–556, 8 figs. Factors in selection of equipment for an installation.

Labor-Saving Equipment. Quality Production from the Application of Automatic Handling Equipment, C. J. Alfred. Mgt. & Administration, vol. 7, no. 5, May 1924, pp. 563–566, 7 figs. Labor-saving methods of Am. Sugar Refining Co.

Plant Painting Department. Handling Material in Painting Department, E. T. Bennington. Iron Age, vol. 113, no. 20, May 15, 1924, pp. 1413–1416, 6 figs. Overhead tramways with special carriers take filing cabinets through three dips, a drip and drying oven; automatic equipment featured.

Routing. Controlling the Flow of Package Products by Materials Handling Equipment, J. Mendleson. Mgt. & Administration, vol. 7, no. 5, May 1924, pp. 545–550, 8 figs. Labor-saving devices and routing methods employed by B. T. Babbitt Co. in manufacture of chlorinated lime, caustic soda, lye, etc.

MERCURY-VAPOR PROCESS

Emmet. The Emmet Mercury-Vapor Process, W. L. R. Emmet. Mech. Eng., vol. 46, no. 5, May 1924, pp. 235–240 and 305, 13 figs. Early experiments; thermodynamic possibilities of process; Hartford installation; boiler problems; mercury turbines; packings and leakage; economies attainable; mercury supply.

METAL CUTTING

Hydrogen-Gas. Cutting Metal with Hydrogen Gas, W. H. L. Porth. Am. Welding Soc.—Jl., vol. 3, no. 3, Mar. 1924, pp. 15–18. Conditions important in connection with determining use of a fuel gas for cutting of metals. Equipment used for cutting with hydrogen as fuel gas, and details of operation.

METALS

Brinell-Tensile Relationship. Experiments on the Brinell-Tensile Relationship, A. L. Norbury and T. Samuel. Iron & Steel Inst.—advance paper, no. 12, for mtg. May 1924, 11 pp., 4 figs. Tensile, Brinell, and scleroscope tests on materials used; plotting of results according to Meyer's formula; comparison of Brinell and tensile results.

Cleaning. Metal Cleansing with Alkaline Cleaning Solutions, E. M. Baker and R. Schneidewind. Am. Electrochem. Soc.—advance paper, no. 15, for meeting Apr. 24–26, 1924, pp. 203–229, 11 figs. Typical analyses of cleaners used for various purposes, and factors entering into mixing of cleaners.

Melting, Fluxes and Slags in. Fluxes and Slags in Metal Melting and Working. Foundry Trade Jl. vol. 29, nos. 402 and 403, May 1 and 8, 1924, pp. 359–363 and 388–390. Abstracts of papers read at a general discussion on this subject which was held Apr. 28, 1924, at Instn. Mech. Engrs., under joint auspices of Faraday Soc., Inst. Metals, Inst. British Foundrymen, and British Non-Ferrous Research Assn., viz.; Oxidizing Fluxes in Melting of Non-Ferrous Metals, A. Portevin; Use of Fluxes in Brass Melting, R. Genders and M. A. Haughton; Note on Slags from Lead, Copper, and Other Blast Furnaces, G. Rigg; Slags Produced in Melting Silver Alloys, J. Phelps; Sulphurizing and Desulphurizing of Metals by Basic Slags and Fluxes, B Bogitch; Slag Inclusions in Relation to Fatigue, B. P. Haigh; Fluxing Problems in Welding Mild Steel with Metallic Arc, H. Ogden; Physical Chemistry of Slags and Fluxes in Non-Ferrous Metal Industries, C. H. Desch; Fluxes and Slags in Oxy-Acetylene Welding, C. C. Smith.

Strain Detection. The Detection of Strain in Metals, J. D. Jevons. Metal Industry (Lond.), vol. 24, no. 10, Mar. 7, 1924, p. 225. Survey of work done by various investigators on this subject, together with comments on practical utility of the different methods suggested.

MOLDING MACHINES

Types. New Molding Machines (Les nouvelles machines à mouler). Fonderie Moderne, vol. 18, Apr. 1924, pp. 100–103, 7 figs. Describes two new machines patented by Glaenzer & Perreaud, for production of foundry cores.

Manufactured by Advertisers

CLASSIFIED LIST OF MECHANICAL EQUIPMENT

Alphabetical List on page 152

Pyrometers, Electric
* American Schaeffer & Budenberg Corp'n
* Bristol Co.
* Crosby Steam Gage & Valve Co.
* Superheater Co.
* Taylor Instrument Cos.

Pyrometers, Expansion Stem
* Tagliabue, C. J. Mfg. Co.

Pyrometers, Optical
* Taylor Instrument Cos.

Pyrometers, Pneumatic
* Uehling Instrument Co.

Pyrometers, Radiation
* Taylor Instrument Cos.

Racks, Machine, Cut
* James, D. O. Mfg. Co.
* Jones, W. A. Fdry. & Mach. Co.
Nuttall, R. D. Co.

Radiators, Steam and Water
* American Radiator Co.
* Smith, H. B. Co.

Railways, Industrial
Easton Car & Construction Co.
Link-Belt Co.

Rams, Hydraulic
* Goulds Mfg. Co.
* Worthington Pump & Machinery Corp'n

Receivers, Air
* Ingersoll-Rand Co.
* Scaife, Wm. B. & Sons Co.
* Walsh & Weidner Boiler Co.
* Wheeler Cond. & Engrg. Co.
* Worthington Pump & Machinery Corp'n

Receivers, Ammonia
* Frick Co. (Inc.)

Recorders, CO
* Tagliabue, C. J. Mfg. Co.
* Uehling Instrument Co.

Recorders, CO_2
* Tagliabue, C. J. Mfg. Co.
* Uehling Instrument Co.

Recorders, SO_2
* Tagliabue, C. J. Mfg. Co.
* Uehling Instrument Co.

Recording Instruments
(See Instruments, Recording)

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* Drake Non-Clinkering Furnace Block Co.
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* King Refractories Co. (Inc.)
Maphite Sales Corp'n

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* Vogt, Henry Machine Co.
* Westinghouse Electric & Mfg. Co.

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* Westinghouse Elect. & Mfg. Co.

Regulators, Blower
* Foster Engineering Co.
* Mason Regulator Co.

Regulators, Condensation
* Tagliabue, C. J. Mfg. Co.

Regulators, Damper
* Coppus Engineering Corp'n
* Fulton Co.
* Kieley & Mueller (Inc.)
* Mason Regulator Co.

Regulators, Electric
* General Electric Co.
* Westinghouse Electric & Mfg. Co.

Regulators, Fan Engine
* Foster Engineering Co.

Regulators, Feed Water
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* Kieley & Mueller (Inc.)
Squires, C. E. Co.

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* Schutte & Koerting Co.

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* Tagliabue, C. J. Mfg. Co.

Regulators, Hydraulic Pressure
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* Mason Regulator Co.

Regulators, Liquid Level
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* General Electric Co.
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* Taylor Instrument Cos.

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(See Governors, Pump)

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* Bristol Co.
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* Sarco Co. (Inc.)
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* Taylor Instrument Cos.

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(See Counters, Revolution)

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* General Electric Co.

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Mackintosh-Hemphill Co.

Riveters, Pneumatic
* Ingersoll-Rand Co.

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* Long & Allstatter Co.

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(See Bearings, Roller)

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* United States Rubber Co.

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Johns-Manville (Inc.)

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* Roebling's, John A. Sons Co.

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Link-Belt Co.
* Roebling's, John A. Sons Co.

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Hill Clutch Machine & Fdry.Co.
* Roebling's, John A. Sons Co.

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* Medart Co.
* Wood's, T. B. Sons Co.

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* Jenkins Bros.
* United States Rubber Co.

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* De La Vergne Machine Co.

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* Frick Co. (Inc.)

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* Crosby Steam Gage & Valve Co.

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* Hendrick Mfg. Co.

Screen, Revolving
* Allis-Chalmers Mfg. Co.
Chain Belt Co.
* Gifford-Wood Co.
* Hendrick Mfg. Co.
Link-Belt Co.
* Smidth, F. L. & Co.

Screens, Shaking
* Allis-Chalmers Mfg. Co.
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* Hendrick Mfg. Co.
Link-Belt Co.

Screens, Water Intake (Traveling)
Chain Belt Co.
Link-Belt Co.

Screw Cutting Dies
(See Dies, Thread Cutting)

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* Jones & Lamson Mach. Co.
* Warner & Swasey Co.

Screws, Cap
* Scovill Mfg. Co.

Screws, Safety Set
Allen Mfg. Co.
* Bristol Co.

Screws, Set
Allen Mfg. Co.

Separators, Ammonia
* De La Vergne Machine Co.
Elliott Co.
* Frick Co. (Inc.)
* United Machine & Mfg. Co.
* Vogt, Henry Machine Co.

Separators, Compressed Air
* United Machine & Mfg. Co.

Separators, Oil
Bethlehem Shipbldg.Corp'n(Ltd.)
* Cochrane Corp'n
* Crane Co.
* De La Vergne Machine Co.
Elliott Co.
Hoppes Mfg. Co.
* Kieley & Mueller (Inc.)
* United Machine & Mfg. Co.
* Vogt, Henry Machine Co.

Separators, Steam
* Cochrane Corp'n
* Crane Co.
Elliott Co.
Hoppes Mfg. Co.
* Kieley & Mueller (Inc.)
* Pittsburgh Valve, Fdry. & Const. Co.
* United Machine & Mfg. Co.
* Vogt, Henry Machine Co.

Shafting
* Allis-Chalmers Mfg. Co.
* Brown, A. & F. Co.
Cumberland Steel Co.
* Falls Clutch & Mchry. Co.
Hill Clutch Machine & Foundry Co.
* Medart Co.
Union Drawn Steel Co.
* Wood's, T. B. Sons Co.

Shafting, Cold Drawn
Hill Clutch Machine & Fdry. Co.
* Medart Co.

Shafting, Flexible
* Gwilliam Co.

Shafting, Turned and Polished
Cumberland Steel Co.
Hill Clutch Machine & Fdry. Co.
Link-Belt Co.

Shapes, Brick
* McLeod & Henry Co.

Shapes, Cold Drawn Steel
Union Drawn Steel Co.

Shears, Alligator
Farrel Foundry & Machine Co.
* Long & Allstatter Co.
* Royersford Foundry & Machine Co.

Shears, Hydraulic
Mackintosh-Hemphill Co.

Shears, Plate
* Long & Allstatter Co.
Mackintosh-Hemphill Co.

Shears, Rotary
* Niagara Machine & Tool Works

Sheaves, Rope
* Brown, A. & F. Co.
Clyde Iron Works Sales Co.
* Falls Clutch & Machinery Co.
Hill Clutch Machine & Fdry. Co.
* Jones, W. A. Fdry. & Mach. Co.
Link-Belt Co.
Mackintosh-Hemphill Co.
* Medart Co.
* Nordberg Mfg. Co.
* Wood's, T. B. Sons Co.

Sheet Metal Work
* Allington & Curtis Mfg. Co.
* Hendrick Mfg. Co.

Sheet Metal Working Machinery
Farrel Foundry & Machine Co.
* Niagara Machine & Tool Works

Sheets, Brass
* Scovill Mfg. Co.

Sheets, Bronze
* Hendrick Mfg. Co.

Sheets, Rubber, Hard
* Goodrich, B. F. Rubber Co.
* United States Rubber Co.

Sheets, Steel
Central Steel Co.

Siphons (Steam-Jet)
* Schutte & Koerting Co.

Slide Rules
Dietzgen, Eugene Co.
Keuffel & Esser Co.
New York Blue Print Paper Co.
ParVell Laboratories
U. S. Blue Co.
Weber, F. Co. (Inc.)

Smoke Recorders
* Sarco Co. (Inc.)

Smoke Stacks and Flues
(See Stacks, Steel)

Sockets, Wire Rope
(See Wire Rope Fastenings)

Soot Blowing Systems
Diamond Power Specialty Corp'n

Space Heaters
* Westinghouse Elec. & Mfg. Co.

Special Machinery
* Brown, A. & F. Co.
* Builders Iron Foundry
* Cramp, Wm. & Sons Ship & Engine Bldg. Co.
DuPont Engineering Co.
Farrel Foundry & Machine Co
* Fawcus Machine Co.
* Franklin Machine Co.
Hill Clutch Machine & Fdry. Co.
Lammert & Mann
Mackintosh-Hemphill Co.
* Nordberg Mfg. Co.
* Smidth, F. L. & Co.
* Vilter Mfg. Co.

Speed Reducing Transmissions
* Cleveland Worm & Gear Co.
* De Laval Steam Turbine Co.
* Foote Bros. Gear & Machine Co
* General Electric Co.
Hill Clutch Machine & Foundry Co.
* James, D. O. Mfg. Co.
* Jones, W. A. Fdry. & Mach. Co.
Link-Belt Co.
Palmer-Bee Co.

Spray Cooling Systems
* Cooling Tower Co. (Inc.)

Sprays, Water
* Cooling Tower Co. (Inc.)

Sprinkler Systems
Rockwood Sprinkler Co.

Sprinklers, Spray
* Cooling Tower Co. (Inc.)

Sprockets
Baldwin Chain & Mfg. Co.
* Diamond Chain & Mfg. Co.
* Foote Bros. Gear & Machine Co.
* Gifford-Wood Co.
Hill Clutch Machine & Mfg.Co
Link-Belt Co.
* Medart Co.
Philadelphia Gear Works

Stacks, Steel
* Bigelow Co.
* Casey-Hedges Co.
* Cole, R. D. Mfg. Co.
* Hendrick Mfg. Co.
Morrison Boiler Co.
* Titusville Iron Works Co.
* Union Iron Works
* Vogt, Henry Machine Co.
* Walsh & Weidner Boiler Co.

Stair Treads
* Irving Iron Works Co.

Stampings, Sheet Metal
Rockwood Sprinkler Co.

Standpipes
* Cole, R. D. Mfg. Co.
Golden-Anderson Valve Specialty Co.
Morrison Boiler Co.
* Walsh & Weidner Boiler Co.

Static Condensers
* Westinghouse Elect. & Mfg. Co.

Steam Specialties
* Crane Co.
* Foster Engineering Co.
* Fulton Co.
Golden-Anderson Valve Specialty Co.
* Kieley & Mueller (Inc.)
Lunkenheimer Co.
* Pittsburgh Valve, Fdry. & Const. Co.
* Sarco Co. (Inc.)

Steel, Alloy
Cann & Saul Steel Co.
Central Steel Co.
Union Drawn Steel Co.

Steel, Bar
Cann & Saul Steel Co.
Central Steel Co.

Steel, Bright Finished
Union Drawn Steel Co.

*Catalogue data of firms marked * appear in the A.S.M.E. Condensed Catalogues of Mechanical Equipment, 1923-24 Volume*

MOLDING METHODS.

Green-Sand, Molding. Hints on Green-Sand Moulding, C. H. Brown. Foundry Trade Jl., vol. 29, no. 399, Apr. 10, 1924, pp. 297–298 (includes discussion). Ramming of mold, venting of molds, effects of bad gating, burning on castings, etc.

Pipe, Special Shapes. Molding Special Pipe Shapes, P. Dwyer. Foundry, vol. 52, no. 10, May 15, 1924, pp. 373–378, 10 figs. Equipment developed for production of large valves and special shapes which usually are ordered in single units or in limited numbers; practice of Pittsburgh Valve, Foundry & Constr. Co.

Spiral Drums. Molding Spiral Drum From Pattern Swept in Loam, J. Taylor. Can. Foundryman, vol. 25, no. 4, Apr. 1924, pp. 12–14, 7 figs. Pattern swept on arbor in similar manner to sweeping cam core; molded same as wooden pattern; core also swept in.

MOTOR BUSES

Engines. Continental Announces Special Engine for Express Bus Service. Automotive Industries, vol. 50, no. 20, May 15, 1924, pp. 1075–1076, 2 figs. 6-cylinder engine has piston displacement of 331 cu. in. and develops maximum of over 70 hp. at 2300 4 p.m.; built for rapid, inter-city passenger work with long, nonstop runs.

MOTOR TRUCKS

Electric. Control Tests of Storage-Battery Vehicles (Essais contrôles de véhicules électriques à accumulateurs). Revue Générale de l'Electricité, vol. 15, nos. 8 and 9, Feb. 23 and Mar. 1, 1924, pp. 306–325 and 356–389, 62 figs. Results of trials conducted by Union des Syndicats de l'Electricité Sept. 28-Oct. 14, 1923, and details of participating trucks and automobiles. Report of Committee of Organization.

N

NAILS

Manufacture. Manufacturing Nails by Automatic Machinery, H. P. Armson. Can. Machy., vol. 31, no. 17, Apr. 24, 1924, pp. 19–21, 3 figs. Practice at Graham Nail Works, Toronto, Can. Raw material first "pickled" to remove scale, then coated with lime to assist lubrication and reduce wear on dies in drawing operation.

NICKEL ALLOYS

Permalloy. Permalloy, A New Magnetic Material of Very High Permeability, H. D. Arnold and G. W. Elmen. Elec. Communication, vol. 2, no. 4, Apr. 1924, pp. 226–231, 7 figs. Describes a magnetic alloy which is a composition of about 78.5 per cent nickel and 21.5 per cent iron and at magnetizing fields in neighborhood of 0.04 gauss and with proper treatment has a permeability running as high as 90,000.

O

OIL ENGINES

Brotherhood-Still. The Brotherhood-Still Heavy Oil Engine. Power Engr., vol. 19, no. 217, Apr. 1924, pp. 128–130, 5 figs. Model of Still engine suited to stationary conditions.

Double-Acting. A Sliding Cylinder Two-cycle Double-acting Marine Oil Engine. Engineer, vol. 137, nos. 3565 and 3566, Apr. 25 and May 2, 1924, pp. 451–452, 4 figs. and 483–485, 6 figs. Design and performance of 2000-b.hp. engine built at North Brit. Diesel Engine Works, Glasgow.

Heavy-Oil. Report on Heavy-Oil Engine Working Costs (1922–23). Diesel Engine Users Assn., Report submitted to Mtg. of Feb. 15, 1924, 20 pp., 2 figs. Deals only with cost of running and maintaining engines and their auxiliaries.

Heavy-Oil, Lubrication of. The Lubrication of Heavy-Oil Engines, C. S. Darling. Mech. Wld., vol. 75, no. 1944, Apr. 4, 1924, pp. 209–210. Deals with lubrication of pistons, cylinders, air compressors, etc., including discussion on oils.

Nickel Applied to Parts. Nickel and Its Alloys Applied to Oil Engine Parts. Motorship, vol. 9, no. 5, May 1924, pp. 361–363, 8 figs. Cast iron is improved by addition of from 3 to 5 per cent of nickel and monel metal reduces maintenance on valves.

Scott-Still. The Scott-Still Marine Engine. Diesel Engine Users Assn.—advance paper no. 38, for mtg. Mar. 14, 1924, 3 pp., 2 figs. Report on 1250-hp. engine at Scott's Shipbldg. & Engrg. Co., Greenock, for M. S. Dolius.

Solid-Injection. The Solid-Injection Oil Engine, H. F. Shepherd. Mech. Eng., vol. 46, no. 5, May 1924, pp. 251–257 and (discussion) 257–258 and 278, 30 figs. Presents most pertinent facts on development of engine from former hot-surface unit and points out influence of combustion-chamber design, spray angle and velocity, atomization, detonation, and other problems confronting oil-engine designer.

OIL FUEL

Burners. Combustion Devices for Liquid Fuel, W. Trinks. Fuels & Furnaces, vol. 2, nos. 1, 2, 3 and 4, Jan. Feb., Mar. and Apr. 1924, pp. 21–24, 135–138, 255–258 and 349–352, 22 figs. Jan.: Burners of vaporization and atomization type or combination of both. Feb.: How atomization is accomplished. Mar.: High furnace atomization; low-pressure atomization. Apr.: Means for proper mixing of atomized liquid fuel and air.

Delivery and Storage. The Delivery and Storage of Fuel Oil, G. Porter. Gas & Oil Power, vol. 19, no. 223, Apr. 3, 1924, pp. 115–116. Advantages and disadvantages of modern methods.

Heavy, Measurement of. The Measurement of Heavy Fuel Oils, G. Porter. Gas & Oil Power, vol. 19, no. 224, May 1, 1924, pp. 137–139, 2 figs. Allowances for variation in temperature. Measuring devices.

Properties. Heating and Motor Oils (Zur Kenntnis der Heiz- und Treiböle), A. Aufhäuser. Zeit. des Vereines deutscher Ingenieure, vol. 68, no. 17, Apr. 26, 1924, pp. 419–422, 1 fig. Points out that properties of oils are functions of degree of distillation, and combustion itself is also a fractionated process; method in use for determination of flash point is of no value for Diesel-engine practice.

Transformation from Solid Fuel. Transformation of Solid into Liquid Fuel, G. L. Stadnikov. Petroleum & Oil-Shale Industry, vol. 5, no. 11–12, Nov.-Dec. 1923, pp. 655–660. (In Russian.)

OIL PUMPS

Screw. The Screw Oil Pump, R. H. Pearsall. Automobile Engr., vol. 14, no. 189, May 1924, pp. 145–147, 10 figs. General principle and analysis of pump action; experiments which corroborate analytical results.

OPEN-HEARTH FURNACES

Moll End. New Open-Hearth Furnace End, H. Moll. Iron Age, vol. 113, no. 19, May 1, 1924, pp. 1277–1278, 1 fig. Practical results from use of new design by author in Germany; advantages of a mixing flue for gases. Translated from Stahl u. Eisen.

Waste-Heat Recovery. Recovery of Waste Heat in Open-Hearth Practice, W. Dyrssen. Iron & Steel Inst.—Advance paper, no. 6, for mtg. May 1924, 48 pp., 16 figs. Complete detailed heat balance of fuel for modern American 80-ton producer-gas open-hearth furnace; results of study of heat balance; heat balance for coke-oven gas-fired open-hearth furnace is given for comparison with producer gas as fuel; steam output for various charges; comparison between blast-furnace and open-hearth practice; economic value of recovery of waste heat in steam in open-hearth practice.

Wis. Steel Works, South Bend, Ind. Wisconsin Steel Works Adds Open-Hearth, G. L. Lacher. Iron Age, vol. 113, no. 20, May 15, 1924, pp. 1421–1425, 7 figs. Separate oil and tar systems, laminated buckstays, motor-operated doors, valves and stack dampers and minimum of water cooling are features of new plant at South Chicago, Ill., comprising five 100-ton furnaces.

ORDNANCE

Production Problems, U. S. War Dept. Some Production Problems in the War Department's Preparedness Program, H. W. Churchill. Mech. Eng., vol. 46, no. 5, May 1924, pp. 268–270 and (discussion) 270–271. Coöperation of engineering, industrial and commercial bodies with War Department; reserve-officer personnel problem; problem of securing facilities for manufacturing war material; problems typical of those confronting plant production engineers; features of type of contract now being developed; raw materials, gages, machine tools. (Abridged.)

OXY-ACETYLENE CUTTING

Advantages and Applications. Oxy-acetylene Process of Cutting Metals. Machy. (Lond.), vol. 24, no. 604, Apr. 24, 1924, pp. 123–125, 3 figs. Advantages of method and modern applications.

OXY-ACETYLENE WELDING

Aluminum. Gas Welding Aluminum, S. W. Miller. Am. Welding Soc.—Jl., vol. 3, no. 3, Mar. 1924, pp. 44–50, 2 figs. Flux used, welding without flux, procedure in welding, character of flame, preheating, manipulation of welding rod and torch, etc.

Locomotive Fireboxes. Welding on Copper Fireboxes of Locomotives, J. F. Springer. Ry. Mech. Engr., vol. 98, no. 5, May 1924, pp. 293–294. Successful results obtained in Europe with oxy-acetylene torch and special filler rods.

Oil and Gas Industry. Theory and Practice in Use of Oxygen, L. Balliet. Oil & Gas Jl., vol. 23, no. 22, May 1, 1924, pp. 34 and 106. Results of extensive research in use of oxygen blowpipe, or acetylene torch, in oil and gas industry. Used for cutting slotted screens, welding pipe line, welding broken parts of machinery, filling in broken gear teeth, cutting off bolt heads, pipe and metal bending, etc.

P

PAINTS

Metal-Protective. Paints for Metals, H. A. Gardner. Paint Mfrs.' Assn. of U. S. Nat. Varnish Mfrs' Assn.—Circular, no. 202, Apr. 1924, pp. 302–327, 10 figs. Review of tests with suggestions regarding design and use of metal protectives.

White Lead. Manufacture of White Lead (Fabrication de la Céruse), N. Chercheffsky. Chimie & Industrie, vol. 11, no. 1, Jan. 1924, pp. 45–48. Observations on the Dutch process; average yield of white lead is about 50 per cent of gross weight of lead taken under abnormal conditions it may be as low as 27 to 28 per cent, but under favorable conditions it may attain 67 to 68 per cent.

PATTERNS

Metal Gear. Metal Gear Patterns, J. F. Hines. Machy. (N. Y.), vol. 30, no. 9, May 1924, pp. 692–693, 4 figs. Metal patterns of type shown are especially satisfactory for casting spur and bevel gears; details of construction; making patterns.

PISTONS

Automatic Machine. Automatic Piston Machine. Iron Age, vol. 113, no. 20, May 15, 1924, pp. 1432–1433, 7 figs. New 6-spindle, 10-in. Contin-U-Matic machine, with which automobile pistons are machined at rate of three per min. with three simultaneous operations.

PLANERS

Equipment for. Tooling Reciprocating Machine Tools. Eng. Production, vol. 7, no. 139, Apr. 1924, pp. 94–97, 10 figs. Tools and special equipment for planers.

PLATES

Flattening Machine. Hydraulic Plate Flattening Machine. Machy. (Lond.), vol. 23, no. 600, Mar. 27, 1924, pp. 838–839, 4 figs. Type which operates on principle of gripping plate at each end and pulling it taut until irregularities and buckles disappear.

PNEUMATIC TOOLS

Waste Elimination. Cutting Out Waste in the Factory Air System, F. Johnston-Taylor. Indus. Mgt. (Lond.), vol. 11, no. 9, May 1, 1924, pp. 239–240 and 242, 4 figs. Explains how wastage and leakage may be detected in connection with pneumatic installations in factory, and how by use of compressed-air meter, economies may be effected.

PULVERIZED COAL

Boiler and Metallurgical Furnaces. Powdered Coal Firing for Water-Tube Boilers and Metallurgical Furnaces, H. W. Hollands. Instn. Mech. Engrs.—Proc., vol. 2, no. 6, 1923, pp. 143–1151, 6 figs. Describes unit system, which consists of one pulverizer per boiler or furnace, and points out its advantages; coal dryings; savings in use of pulverized coal. (Abridged.)

Boiler Firing. Pulverized-Coal Firing (Ueber Kohlenstaub-Feuerung). Zeit. für die Gesamte Giessereipraxis, vol. 45, no. 13–14, Apr. 5, 1924, pp. 77–79, 3 figs. Description of "Kofino" coal mill, manufactured by Krupp-Gruson Works.

Calculations. Calculations Respecting Pulverized Fuel, E. Kilburn Scott. Power Engr., vol. 19, no. 217, Apr. 1924, pp. 148 and 157. Also Combustion, vol. 10, no. 5, May 1924, pp. 360–361. Elementary considerations regarding use of pulverized fuel, arranged as calculations.

Preparation and Utilization. Powdered Coal: Its Preparation and Utilization, R. Jackson. Engineering, vol. 117, nos. 3038 and 3039, Mar. 21 and 28, 1924, pp. 381–383 and 415–418, 22 figs. (Abstract.) Paper read before Instn. Mech. Engrs.

Tests. Experiences with Coal Dust and Combustion of Pulverized Coal (Les expériences sur les poussières de houille et la combustion du charbon pulverisé), J. Arnoul de Grey. Chaleur & Industrie, vol. 5, no. 45, Jan. 1924, pp. 23–26, 2 figs. Calls attention to some of more important results obtained by Taffanel and Audibert from tests carried out at Liévin and Montlucon, and discusses their application to different problems of combustion of pulverized coal, dealing with problem of burners, combustion chambers, and possibility of utilizing certain combustibles in pulverized state.

Unit System. Unit System for Pulverized Coal, S. C. Martin. Power Plant Eng., vol. 28, no. 9, May 1, 1924, pp. 471–472, 1 fig. Advantages of unit system in remodeled plants; results of tests.

PUMPS

Drainage. Some Large Dutch Drainage Pumps, J. C. Dijxhoorn. Engineer, vol. 137, no. 3567, May 9, 1924, pp. 506–507, 3 figs. Particulars concerning pumps which were put to work over 3 years ago near village of Zoutkamp on Lauwer Zee. (Abstract.) Paper read before Instn. Engrs. & Shipbldrs. in Scotland.

Rotary. A New Rotary Pump (Neuerung im Bau von Rotationspumpen), E. Winter. Zeit. des Oesterr. Ingenieur- u. Architekten-Vereines, vol. 76, no. 9–10, Mar. 7, 1924, pp. 80–81, 7 figs. Describes "Feuerheerd" pump, named after its inventor. Shaft drives inner rotor, which carries three radial projections or arms, which fit into four corresponding pockets of outer rotor. Pump provides a uniform flow, is simple and reliable and has found considerable use in England and British Colonies.

PUMPS, CENTRIFUGAL

Characteristic Curves. Use of Centrifugal Pump Curves. Power Plant Eng., vol. 28, no. 9, May 1, 1924, pp. 497–499, 2 figs. Usual forms of characteristic curves for centrifugal pumps based on constant speed.

Specifications. Notes on Centrifugal Pump Specifications, J. D. Morgan. Power Plant Eng., vol. 28, no. 10, May 15, 1924, pp. 555–559, 7 figs. Service requirements are principal data needed by designer; service records show dependability of centrifugal pumps.

PUNCHING MACHINES

Patents. Punching and Perforating Machines and Hand Tools for Cutting, Punching, Perforating, and Tearing Paper, Leather, Fabrics, and the Like. Abridgments of Specification, Period 1916–20, Class 31 (ii), 1924, 29 pp. (illustrated). Patents for inventions.

PYROMETERS

Disappearing-Filament. A Direct-Reading Pyrometer of the Disappearing-Filament Type, F. H. Schofield and D. C. Gall. Jl. Sci. Instruments, vol. 1, no. 7, Apr. 1924, pp. 193–198, 5 figs. Modified form of disappearing-filament pyrometer in which pyrometer lamp forms one arm of a Wheatstone bridge.

Radiation. The "Pyro" Radiation Pyrometer. Engineering, vol. 117, no. 3042, Apr. 18, 1924, pp. 493–494, 6 figs. It is easily portable, weighing only 25 oz., and is completely self-contained, requiring no batteries or other accessory apparatus.

Manufactured by Advertisers — CLASSIFIED LIST OF MECHANICAL EQUIPMENT — Alphabetical List on page 152

Steel, Chrome
Central Steel Co.

Steel, Chrome Nickel
Central Steel Co.

Steel, Chromium Alloy
Central Steel Co.

Steel, Cold Drawn
Union Drawn Steel Co.

Steel, Cold Rolled
Cumberland Steel Co.
Union Drawn Steel Co.

Steel, Hot Rolled
Central Steel Co.

Steel, Molybdenum
Central Steel Co.

Steel, Nickel
Central Steel Co.
Union Drawn Steel Co.

Steel, Open-Hearth
* Falk Corporation
Union Drawn Steel Co.

Steel, Rock Drill
* Ingersoll-Rand Co.

Steel, Screw, Cold Drawn
Union Drawn Steel Co.

Steel, Spring
Central Steel Co.

Steel, Strip (Cold Rolled)
Driver-Harris Co.

Steel, Tool
Cann & Saul Steel Co.

Steel, Vanadium
Central Steel Co.
Union Drawn Steel Co.

Steel Plate Construction
Bethlehem Shipbldg.Corp'n(Ltd.)
* Bigelow Co.
* Burhorn, Edwin Co.
* Casey-Hedges Co.
* Cole, R. D. Mfg. Co.
* Graver Corp'n
* Hendrick Mfg. Co.
* Keeler, E. Co.
Morrison Boiler Co.
Steere Engineering Co.
* Titusville Iron Works Co.
* Union Iron Works
* Vogt, Henry Machine Co.
* Walsh & Weidner Boiler Co.

Steps, Ladder & Stair (Non-Slipping)
* Irving Iron Works Co.

Stills
* Vogt, Henry Machine Co.

Stocks and Dies
* Landis Machine Co. (Inc.)

Stokers, Chain Grate
* Babcock & Wilcox Co.
* Combustion Engineering Corp'n
* Westinghouse Electric & Mfg. Co.

Stokers, Overfeed
* Detroit Stoker Co.
* Riley, Sanford Stoker Co.
* Westinghouse Electric & Mfg. Co.

Stokers, Traveling Grate, Anthracite
* United Machine & Mfg. Co.

Stokers, Underfeed
* American Engineering Co.
* Combustion Engineering Corp'n
* Detroit Stoker Co.
* Riley, Sanford Stoker Co.
* Sturtevant, B. F. Co.
* United Machine & Mfg. Co.
* Westinghouse Electric & Mfg. Co.

Strainers, Oil
* Bowser, S. F. & Co. (Inc.)
* Mason Regulator Co.

Strainers, Steam
* Foster Engineering Co.
* Kieley & Mueller (Inc.)
* Mason Regulator Co.

Strainers, Water
Elliott Co.
* Foster Engineering Co.
Golden-Anderson Valve Specialty Co.
* Kieley & Mueller (Inc.)
* Mason Regulator Co.
* Schutte & Koerting Co.

Strainers, Water (Traveling)
Link-Belt Co.

Structural Steel Work
* Hendrick Mfg. Co.
* Walsh & Weidner Boiler Co.

Sugar Machinery
Farrel Foundry & Machine Co.
* Walsh & Weidner Boiler Co.

Superheaters, Steam
* Babcock & Wilcox Co.
* Power Specialty Co.
* Superheater Co.

Superheaters, Steam (Locomotive)
* Power Specialty Co.
* Superheater Co.

Superheaters, Steam (Marine)
* Power Specialty Co.
* Superheater Co.

Switchboards
* General Electric Co.
* Westinghouse Electric & Mfg. Co.

Switches, Electric
* General Electric Co.
* Westinghouse Electric & Mfg. Co.

Synchronous Converters
(See Converters, Synchronous)

Tables, Drawing
Dietzgen, Eugene Co.
Economy Drawing Table & Mfg. Co.
Keuffel & Esser Co.
New York Blue Print Paper Co
ParVell Laboratories
U. S. Blue Co.
Weber, F. Co. (Inc.)

Tachometers
* American Schaeffer & Budenberg Corp'n
* Bristol Co.
Veeder Mfg. Co.

Tachoscopes
* American Schaeffer & Budenberg Corp'n

Tanks, Acid
* Graver Corp'n
* Walsh & Weidner Boiler Co.

Tanks, Ice
* Frick Co. (Inc.)
* Graver Corp'n

Tanks, Oil
* Graver Corp'n
* Hendrick Mfg. Co.
Morrison Boiler Co.
* Scaife, Wm. B. & Sons Co.
* Titusville Iron Works Co.
* Walsh & Weidner Boiler Co.

Tanks, Pressure
* Graver, Corp'n
* Hendrick Mfg. Co.
Morrison Boiler Co.
* Titusville Iron Works Co.
* Vogt, Henry Machine Co.
* Walsh & Weidner Boiler Co.

Tanks, Steel
Bethlehem Shipbldg.Corp'n(Ltd.)
* Bigelow Co.
* Casey-Hedges Co.
* Cole, R. D. Mfg. Co.
* Graver Corp'n
* Hendrick Mfg. Co.
Morrison Boiler Co.
* Scaife, Wm. B. & Sons Co.
* Titusville Iron Works Co.
* Union Iron Works
* Vogt, Henry Machine Co.
* Walsh & Weidner Boiler Co.

Tanks, Storage
* Cochrane Corp'n
* Cole, R. D. Mfg. Co.
* Combustion, Engineering Corp'n
* Graver Corp'n
* Hendrick Mfg. Co.
Morrison Boiler Co.
* Scaife, Wm. B. & Sons Co.
* Titusville Iron Works Co.
* Vogt, Henry Machine Co.
* Walsh & Weidner Boiler Co.

Tanks, Tower
* Graver Corp'n
* Walsh & Weidner Boiler Co.

Tanks, Welded
* Cole, R. D. Mfg. Co.
* Graver Corp'n
Morrison Boiler Co.
* Scaife, Wm. B. & Sons Co.

Tap Extensions
Allen Mfg. Co.

Tapping Attachments
* Whitney Mfg. Co.

Temperature Regulators
(See Regulators, Temperature)

Testing Laboratories, Cement
* Smidth, F. L. & Co.

Textile Machinery
* Franklin Machine Co.

Thermometers
* American Schaeffer & Budenberg Corp'n
* Ashton Valve Co.
* Bristol Co.
* Sarco Co. (Inc.)
* Tagliabue, C. J. Mfg. Co.
* Taylor Instrument Cos.

Thermometers, Chemical
* Tagliabue, C. J. Mfg. Co.

Thermometers, Distance
* Taylor Instrument Cos.

Thermometers, High Range (Recording)
* Bailey Meter Co.
* Tagliabue, C. J. Mfg. Co.
* Taylor Instrument Cos.

Thermometers, Industrial
* Tagliabue, C. J. Mfg. Co.

Thermostats
* Bristol Co.
* Fulton Co.
* General Electric Co.

Thread Cutting Tools
* Crane Co.
* Jones & Lamson Machine Co.
* Landis Machine Co. (Inc.)

Threading Machines, Pipe
* Landis Machine Co. (Inc.)

Tie Tamping Outfits
* Ingersoll-Rand Co.

Time Recorders
* Bristol Co.

Tinsmiths' Tools and Machines
* Niagara Machine & Tool Works

Tipples, Steel
Link-Belt Co.

Tools, Brass-Working Machine
* Warner & Swasey Co.

Tools, Machinist's Small
* Atlas Ball Co.

Tools, Pneumatic
* Ingersoll-Rand Co.

Tools, Special
DuPont Engineering Co.

Tracks, Industrial Railway
Easton Car & Construction Co.

Tracks, Overhead
Palmer-Bee Co.

Tractors
* Allis-Chalmers Mfg. Co.

Tractors, Industrial (Storage Battery)
* Yale & Towne Mfg. Co.

Tractors, Turntable
* Whiting Corp'n

Trailers, Industrial
* Yale & Towne Mfg. Co.

Tramrail Systems, Overhead
* Brown Hoisting Machinery Co.
Link-Belt Co.
* Whiting Corp'n

Tramways, Bridge
Link-Belt Co.

Tramways, Wire Rope
Clyde Iron Works Sales Co.
Lidgerwood Mfg. Co.
* Roebling's, John A. Sons Co.

Transfer Tables
* Whiting Corp'n

Transformers, Electric
* Allis-Chalmers Mfg. Co.
* General Electric Co.
* Westinghouse Electric & Mfg. Co.

Transmission Machinery
(See Power Transmission Machinery)

Transmissions, Automobile
* Foote Bros. Gear & Machine Co.

Transmissions, Variable Speed
* American Fluid Motors Co.
* Foote Bros. Gear & Machine Co.

Traps, Radiator
* American Radiator Co.
* Sarco Co. (Inc.)

Traps, Return
* American Blower Co.
* Crane Co.
* Kieley & Mueller (Inc.)

Traps, Steam
* American Blower Co.
* American Schaeffer & Budenberg Corp'n
* Crane Co.
Elliott Co.
Golden-Anderson Valve Specialty Co.
* Jenkins Bros.
Johns-Manville (Inc.)
* Kieley & Mueller (Inc.)
* Reading Steel Casting Co. (Inc.)
(Pratt & Cady Division)
* Sarco Co. (Inc.)
* Schutte & Koerting Co.
Squires, C. E. Co.
* Vogt, Henry Machine Co.

Traps, Vacuum
* American Blower Co.
* American Schaeffer & Budenberg Corp'n
* Crane Co.
* Sarco Co. (Inc.)

Treads
* Irving Iron Works Co.

Treads, Stair (Rubber)
* United States Rubber Co.

Trolleys
* Brown Hoisting Machinery Co.
* Whiting Corp'n

Trolleys, Monorail
Palmer-Bee Co.

Trucks, Industrial (Storage Battery)
* Yale & Towne Mfg. Co.

Trucks, Trailer
* Yale & Towne Mfg. Co.

Tubes, Boiler, Seamless Steel
* Casey-Hedges Co.

Tubes, Condenser
* Scovill Mfg. Co.
* Wheeler Condenser & Engrg. Co.

Tubes, Pitot
* American Blower Co.
Bacharach Industrial Instrument Co.

Tubing, Rubber
* Goodrich, B. F. Rubber Co.
* United States Rubber Co.

Tubing, Rubber (Hard)
* Goodrich, B. F. Rubber Co.

Tumbling Barrels
Farrel Foundry & Machine Co.
* Royersford Fdry. & Mach. Co.
* Whiting Corp'n

Turbines, Hydraulic
* Allis-Chalmers Mfg. Co.
* Cramp, Wm. & Sons Ship & Engine Bldg. Co.
Hoppes Water Wheel Co.
* Leffel, James & Co.
Newport News Shipbuilding & Dry Dock Co.
Smith, S. Morgan Co.
* Worthington Pump & Mchry. Corp'n

Turbines, Steam
* Allis-Chalmers Mfg. Co.
* Coppus Engineering Corp'n
* De Laval Steam Turbine Co.
* General Electric Co.
* Kerr Turbine Co.
Ridgway Dynamo & Engine Co.
* Sturtevant, B. F. Co.
* Terry Steam Turbine Co.
* Westinghouse Elec. & Mfg. Co.
* Wheeler Condenser & Engrg. Co.

Turbo-Blowers
* Coppus Engineering Corp'n
* General Electric Co.
* Ingersoll-Rand Co.
* Kerr Turbine Co.
* Sturtevant, B. F. Co.

Turbo-Compressors
* Ingersoll-Rand Co.

Turbo-Generators
* Allis-Chalmers Mfg. Co.
* De Laval Steam Turbine Co.
* General Electric Co.
* Kerr Turbine Co.
Ridgway Dynamo & Engine Co.
* Sturtevant, B. F. Co.
* Terry Steam Turbine Co.
* Westinghouse Electric & Mfg. Co.

Turbo-Pumps
Bethlehem Shipbldg. Corp'n (Ltd)
* Coppus Engineering Corp'n
* Kerr Turbine Co.
* Terry Steam Turbine Co.
* Wheeler Condenser & Engineering Co.

Turntables
Easton Car & Construction Co.
Link-Belt Co.
Palmer-Bee Co.
* Whiting Corp'n

Turret Machines
(See Lathes, Turret)

Unions
* Crane Co.
Lunkenheimer Co.
* Pittsburgh Valve, Fdry. & Const. Co.
* Vogt, Henry Machine Co.

Unions, Pressed Steel
Rockwood Sprinkler Co.

Unloaders, Air Compressor
* Ingersoll-Rand Co.
* Worthington Pump & Machinery Corp'n

Unloaders, Ballast
Lidgerwood Mfg. Co.

Unloaders, Car
* Gifford-Wood Co.
Link-Belt Co.

Vacuum Breakers
* Foster Engineering Co.

*Catalogue data of firms marked * appear in the A.S.M.E. Condensed Catalogues of Mechanical Equipment, 1923-24 Volume*

R

RAILLESS TRACTION

Advantages. The Case for Railless Traction. Tramway & Ry. Wld., vol. 55, no. 14, Mar. 20, 1924, pp. 132–134. Shows by means of actual and hypothetical figures, that for practically the whole field of municipal transport railless electric traction cannot only satisfy all traffic requirements, but can effect considerable saving in capital expenditure and operating costs.

RAILS

Corrugation. Investigation of Corrugation of Rails with Aid of Torsiograph (Untersuchung der Riffelbildung an Schienen mit Hilfe des Torsiographen), J. Geiger. Zeit. des Vereines deutscher Ingenieure, vol. 68, no. 12, Mar. 22, 1924, pp. 283–284, 7 figs. Measurement on rolling cars show plainly that corrugation is due to frictional oscillations, resulting from irregular speeds of both wheels of same axis when traveling over curves.

Fracture. Broken Rails. Ry. & Locomotive Eng., vol. 37, no. 5, May 1924, pp. 150–152, 4 figs. Extracts from reports on broken rails that caused derailments and loss of life, published by Bur. Safety.

RAILWAY ELECTRIFICATION

Developments. Railway Electrification in Foreign Countries. Stanley P. Smith. Instn. Elec. Engrs.—Jl., vol. 62, no. 328, Apr. 1924, pp. 317–322 and (discussion) 322–324. Deals with various countries, not including Great Britain.

Pa. R. R., Pa. Electrification of the Ft. Washington Branch, P. R. R. Ry. Rev , vol. 74, no. 19, May 10, 1924, pp. 843–845, 5 figs. Previous electrical installation in Philadelphia suburban district extended over 6.2 mi. of single track.

RAILWAY MOTOR CARS

Electromechanically vs. Mechanically Operated. Experimental Operation of Rail Cars Driven by Internal-Combustion Engines by Means of Purely Mechanical Transmission (Het proefbedrijf met benzine-Maatschappij), H. J. P. Brunner. Ingenieur, vol. 39, no. 17, Apr. 26, 1924, pp. 312–317, 4 figs. Comparative tests made by Limburg Railway Co. between electromechanically and purely mechanically operated rail cars indicate superiority of electromechanical system.

RAILWAY OPERATION

Paulista Ry., Brazil. Electric Operation of Paulista Railway in Brazil, G. Bellows. Ry. Elec. Engr., vol. 15, no. 4, Apr. 1924, pp. 107–109, 6 figs. Electrification of section between Jundiahy and Campinas where wood and imported coal is used for fuel shows large savings. Service requirements, locomotive performance, and costs.

Stopping and Starting Trains. Estimated Cost of Stopping and Starting Trains, O. O. Carr. Ry. Rev., vol. 74, no. 18, May 3, 1924, pp. 807–808. Tables giving estimated additional costs to stop and start trains.

Train Control. An Unusual Idea in Automatic Train Control. Ry. Rev., vol. 74, no. 16, Apr. 19, 1924, pp. 723–731, 14 figs. Describes train-control system of Indiana Equipment Corp., designed and developed by C. F. Shadle, which is of the ramp or direct-contact type. Essential parts of device consist of a wayside ramp, a contact shoe having a roller contact, a neutral control relay, an electropneumatic valve, automatic air-brake valve, and a speed controller.

Automatic Cut-Off Control Tested in Service. Ry. Age, vol. 76, no. 21, Apr. 26, 1924, pp. 1033–1037, 9 figs. Describes control device and tells what its performance on two railroads has demonstrated.

Hearing on Automatic Train Control Order. Ry. Age, vol. 76, no. 23, May 10, 1924, pp. 1145–1148. Statement by W. J. Harahan outlining position of railroads and proposing three regional tests on 100 mi. of line in each region; testimony of W. S. Stone that engineers are strongly opposed to automatic control.

Service Tests of Automatic Cut-Off Control. Ry. Mech. Engr., vol. 98, no. 5, May 1924, pp. 267–272, 12 figs. Describes control device; what its performance on two railroads has demonstrated.

RAILWAY REPAIR SHOPS

Denver & Rio Grande Western. Denver & Rio Grande Western Rebuilds Shops. Ry. Age, vol. 76, no. 24, May 17, 1924, pp. 1193–1200, 11 figs. Completes extensive program of modernization of facilities for repair of cars and locomotives; details of new facilities at Denver, Colo., and at Salt Lake City.

Locomotive. The New Shops of the Compagnie Paris-Lyon-Méditerranée, at Nevers (Les nouveaux ateliers de machines de la Compagnie Paris-Lyon-Méditerranée, à Nevers), M. Pouillon. Revue Générale des Chemins de Fer & des Tramways, vol. 43, no. 3, Mar. 1924, pp. 159–171, 5 figs. Details of shops designed and equipped to repair 50 locomotives and 30 tenders per month.

Organization. B. R. & P. Has Well Organized Production Shop (Du Bois, Pa.). Ry. Mech. Engr., vol. 98, no. 5, May 1924, pp. 295–299, 6 figs. Limited program of repairs facilitates efficient operations; routing of locomotives and parts; department organization and machine-tool operation; shop organization.

Steel Cars. Pennsylvania Builds Modern Steel Car Shops. Ry. Age, vol. 76, no. 22, May 3, 1924, pp. 1085–1088, 9 figs. Duplicate designs erected at Pitcairn and Enola to handle heavy repairs on Eastern and Central regions; capacity of each shop is 33 cars a day; each car-repair unit consists of rivet-cutting shed housing 8 cars at a time, repair shop with 36 tear-down and 18 set-up positions, combined storeroom, office and welfare building.

RAILWAY SHOPS

Grinding Machines for. Machine Tools for Railway Workshops. Ry. Gaz., vol. 40, no. 15, Apr. 11, 1924, pp. 544–546, 6 figs. Describes some electrically driven grinding machines.

RAILWAY SIGNALING

A. C. Supply with Battery Reserve. The Application of Alternating Current Supply with Battery Reserve to Signal Systems, H. G. Morgan. Am. Ry. Assn., Signal Section Proc., Mar. 1924, pp. 698–705. Results obtained with various applications.

Benefits of. How Signaling Has Helped Several Roads. Ry. Age, vol. 76, no. 20, Apr. 19, 1924, pp. 971–974. Prize papers received in contest arranged by Railway Age and Railway Signaling, as follows: Congestion Relieved by Signaling on the B. & M., J. D. Bourne; Increasing Track Capacity by Signaling, Gel. S. Pflasterer; Cost Saving Accomplished by Signals on the B. & O., J. C. Hoffman.

RAILWAY TIES

Concrete. Concrete Ties for Light-Traffic Track in France, Adam. Eng. News-Rec., vol. 92, no. 18, May 1, 1924, p. 761, 1 fig. Reduction of maintenance forces and cost follows replacement of wood ties by concrete ties and pairs of blocks.

RAILWAY YARDS

Electric Power Signaling. All-Electric Power Signaling Installation and Electric Apparatus, Feltham Yard, Southern Railway, W. J. Thorrowgood. Ry. Engr., vol. 45, nos. 531 and 532, Apr. and May 1924, pp. 126–132 and 140, and 157–163, 19 figs. Speedy operation of points and automatic track-circuit protection are features of shunting yard; track-circuit tests; electrical point detection; push-button signal frames; electric clocks; telephone communication.

RAPID TRANSIT

Suburban, New York City. Suburban Transit Plan Suggested for New York City. Eng. News-Rec., vol. 92, no. 19, May 8, 1924, pp. 818–820, 1 fig. Independent subway system to connect with trunk-line railways outside of Manhattan Island; new streets proposed.

REFRACTORIES

Electric-Brass-Furnace. The Electric Brass Furnace Refractory Situation, H. W. Gillett and E. L. Mack. Am. Ceramic Soc.—Jl., vol. 7, no. 4, Apr. 1924, pp. 288–299, 5 figs. Describes the three prominent types of electric brass furnaces, and outlines conditions which they impose on refractories. Limitations which properties of refractories place on applicability of the various furnaces, and lines along which development and improvement are most likely to take place. (Pub. by permission U. S. Bur. Mines.)

REFRIGERANTS

Ethyl Chloride. Thermal Properties of Ethyl Chloride. Ice & Refrigeration, vol. 66, no. 4, Apr. 1924, pp. 347–348. Summary of report of results obtained by C. F. Jenkin and D. N. Shorthose of Univ. of Oxford, Eng. General physical and chemical properties; tables of saturated and superheated vapor.

REFRIGERATION

Brine Hold-Over Tanks, Heat Transfer in. Heat Transfer in Brine Hold-Over Tanks, C. H. Herter. Refrig. Eng., vol. 10, no. 10, Apr. 1924, pp. 370–371 and 375. Describes three types of hold-over tanks; makes heat-transfer calculations.

Non-Condensable Gases. Non-Condensable Gases, B. E. Hill. Refrig. Eng., vol. 10, no. 10, Apr. 1924, pp. 372–375, 1 fig. Their causes and effects upon economical and efficient operation of an ice-making or refrigerating system.

ROLLING MILLS

Continuous. Continuous Rolling-Mills: Their Growth and Development, Jos. P. Bedson. Iron & Steel Inst.—advance paper, no. 3, for mtg. May 1924, 18 pp., 6 figs. partly on supp. plates. Art as it was practiced 140 years ago; history of development; modern examples of continuous system. See (abstract) in Engineering, vol. 117, no. 3045, May 9, 1924, pp. 620–622, 7 figs.; also Iron Age, vol. 113, no. 21, May 22, 1924, pp. 1493–1495.

Defective Material, Detection of. Statistical Basis for Industrial Control, K. Daeves. Iron Age, vol. 113, no. 20, May 15, 1924, pp. 1441–1443, 3 figs. A "large numbers" method applied in Germany to metallurgy of iron; theory of collective subjects in relation to control of production; detection and control of defective material in rolling mill is claimed possible if certain statistical formulas or data are made use of. Translated from Stahl u. Eisen.

Sheet Mills. Build Sheet Mill at Golden Gate. Iron Trade Rev., vol. 74, no. 21, May 22, 1924, pp. 1373–1375, 5 figs. Subsidiary of Metal & Thermit Corp. completes new six-mill sheet plant at South San Francisco; oil fuel used in furnaces.

Sheet Mill Represents Latest Practice, E. H. Werner. Forging—Stamping—Heat Treating, vol. 10, no. 4, Apr. 1924, pp. 153–158, 10 figs. New mill of Nat. Enameling & Stamping Co. at Granite City, Ill.; mill equipment and furnaces.

S

SCREW THREADS

Comparators. The Wilson Projection Comparator for Screw Threads. Engineering, vol. 117, no. 3045, May 9, 1924, pp. 606–608, 6 figs. Devised for gaging screw threads and other similar solids of revolution.

Cutting Tools. Position of Thread-cutting Tool and its Effect on Thread Form. Machy. (Lond.), vol. 24, no. 602, Apr. 10, 1924, pp. 54–55, 2 figs. Position of tool for external thread cutting; distortion produced in cutting internal threads; distortion of thread grooves having angular sides.

Measurement. Measuring Threads Accurately with Micrometers. Can. Machy., vol. 31, no. 18, May 1, 1924, pp. 31–32 and 51, 6 figs. Hints on accurate use of micrometers.

SEPARATORS

Ash-Reclaiming. Recovering Fuel from Ashes, S. H. Bunnell. Iron Age, vol. 113, no. 19, May 8, 1924, p. 1368, 2 figs. Operation of Kolumbus coke separator, developed by Benno Schilde Machy. Co., Germany, and marketed by Ash Reclaiming Machy. Co., New York, in America.

SHAFTS

Whirling. Internal Friction Theory of Shaft Whirling, A. L. Kimball, Jr. Gen. Elec. Rev., vol. 27, no. 4, Apr. 1924, pp. 244–251, 11 figs. Shows Kimball's theory of internal friction in shafts as cause of whirling; shows that internal friction due to bending may cause a shaft to whirl when rotating at any speed about first critical speed.

SMOKE

Analysis. The Analysis of Smoke (Ueber die Analyse von Rauch), H. Salmang. Zeit. für angewandte Chemie, vol. 37, no. 8, Feb. 21, 1924, pp. 97–98, 1 fig. Method of determining solid and liquid components in smoke and fog.

SPRINGS

Automobile. Supplementary Air Spring Designed by Great Pianist. Automotive Industries, vol. 50, no. 18, May 1, 1924, p. 958, 1 fig. Supplementary springs of pneumatic type manufactured by Stevens Mfg. Co., Lowell, Mass., and invented by Josef Hofmann, 10,000 of which are said to be in use in Europe.

Leaf. Suspension. Automobile Engr., vol. 14, no. 189, May 1924, pp. 135–140, 30 figs. Recent improvements in laminated springs.

STEAM ACCUMULATORS

Ruths. Steam Turbine and Steam Accumulator at the Tuborg Works (Tuborgs Fabrikkers nye Dampturbine og Dampakkumulatoranlaeg), T. E. Thomsen. Ingeniören, vol. 33, no. 12, Mar. 22, 1924, pp. 134–143, 9 figs. Describes installation of accumulator of Ruths type, and new turbines; claimed to be a highly economical method of increasing capacity of power station.

Thermotechnical and Practical Advantages of the Ruths Accumulator (Wärme- und betriebswirtschaftliche Vorteile des Ruths-Speichers), C. Bientzle. Glasers Annalen, vol. 94, no. 7, Apr. 1, 1924, pp. 75–80 and (discussion) 80–84, 7 figs. Points out its important influence on production, through saving in time, by shortening of working process, saving in fuel by reduction of cooling-off losses, better control of whole operation, and improvement of quality of products.

STEAM ENGINES

Uniflow. The Uniflow or Central Exhaust Engine, E. Dickinson. Inst. Mar. Engrs.—Trans., Mar. 1924, pp. 627–642, 11 figs. Principle and important features of engine; consideration of parts.

STEAM PIPES

High-Pressure. Piping for High Pressure and Temperature, R. A. Fiske. Power Plant Eng., vol. 28, no. 8, Apr. 15, 1924, pp. 424–427, 5 figs. Shows effect of temperature upon tensile strength of 15 to 36-point carbon steel and on wrought-iron pipe; friction losses in superheated lines; pressure drop in fittings; heat transmission through pipe walls; joints for high-pressure steam lines.

STEAM POWER PLANTS

Industrial Plants. Prime Movers for Industrial Plants, J. F. Ferguson. Power, vol. 59, no. 20, May 13, 1924, pp. 766–768, 1 fig. Comparison of various types of engines and turbines for use in industrial plants, with summary on economies and relative advantages.

Physical Laws, Practical Bearing of. The Bases of Efficiency in Power Production, C. F. Dewynter. Power Engr., vol. 19, no. 218, May 1924, pp. 166–168, Shows practical bearing of physical laws, especially in regard to steam power.

Working Costs. Working Costs in Small Power Plants, T. E. Love. Instn. Engrs. (India)—Jl., vol. 4, Apr. 1924, pp. 160–168, 3 charts on supp. plates. Deals with capital charges which include depreciation and interest on capital expenditure, and running charges which include cost of fuel, lubricating oil, water supply, labor and stores and repairs.

STEAM TURBINES

Checking Condition. Maintaining Impulse-Turbine Efficiency by Checking the Condition Curve, Rob. R. Walden. Power, vol. 59, no. 21, May 20, 1924, pp. 823–825, 2 figs. Various stage pressures at normal load indicate if turbine is in efficient state or internal damage or undue wear will alter these from normal.

Exhaust and Live Steam, Cost of. Finding the Cost of Exhaust as Compared to Live Steam, C. E. Colburn. Power, vol. 59, no. 20, May 13, 1924, pp. 759–760, 1 fig. Why exhaust steam should be cheaper than live steam; typical examples.

High-Pressure. High-pressure Turbines. Engineer, vol. 137, no. 3566, May 2, 1924, pp. 489–490, 5 figs. Special turbines developed by Brown, Boveri & Co.

High Pressure, Superheat, and Vacuum. The Effect of High Pressure, Superheat and Vacuum on the Efficiency of Large Turbines, C. Sylvester. Elec. Times, vol. 65, no. 1692, Mar. 20, 1924, pp. 327–328.

Manufactured by Advertisers

CLASSIFIED LIST OF MECHANICAL EQUIPMENT

Alphabetical List on page 152

Vacuum Dryers, Pans, Pumps, Traps, etc.
(See Pans, Pumps, Traps, etc., Vacuum)

Valve Discs
Garlock Packing Co.
* Goodrich, B. F. Rubber Co.
* Jenkins Bros.
* Reading Steel Casting Co. (Inc.) (Pratt & Cady Division)
* United States Rubber Co.

Valves, Air, Automatic
* Fulton Co.
* Jenkins Bros.
* Simplex Valve & Meter Co.
* Smith, H. B. Co.

Valves, Air (Operating)
* Foster Engineering Co.

Valves, Air, Relief
* American Schaeffer & Budenberg Corp'n
* Foster Engineering Co.
* Fulton Co.
Lunkenheimer Co.
* Nordberg Mfg. Co.
* Schutte & Koerting Co.

Valves, Altitude
* Foster Engineering Co.
Golden-Anderson Valve Specialty Co.
* Simplex Valve & Meter Co.

Valves, Ammonia
* American Schaeffer & Budenberg Corp'n
* Crane Co.
* De La Vergne Machine Co.
* Foster Engineering Co.
* Jenkins Bros.
Lunkenheimer Co.
* Reading Steel Casting Co. (Inc.) (Pratt & Cady Division)
* Vilter Mfg. Co.
* Vogt, Henry Machine Co.

Valves, Back Pressure
* Cochrane Corp'n
* Crane Co.
* Foster Engineering Co.
* Jenkins Bros.
* Kieley & Mueller (Inc.)
* Pittsburgh Valve, Fdry & Const. Co.
* Reading Steel Casting Co. (Inc.) (Pratt & Cady Division)
* Schutte & Koerting Co.

Valves, Balanced
* Crane Co.
* Foster Engineering Co.
Golden-Anderson Valve Specialty Co.
* Kieley & Mueller (Inc.)
Lunkenheimer Co.
* Mason Regulator Co.
* Nordberg Mfg. Co.
* Schutte & Koerting Co.

Valves, Blow-off
* Ashton Valve Co.
* Bowser, S. F. & Co. (Inc.)
* Crane Co.
* Crosby Steam Gage & Valve Co.
Elliott Co.
* Jenkins Bros.
Lunkenheimer Co.
* Pittsburgh Valve, Fdry. & Const. Co.
* Reading Steel Casting Co. (Inc.) (Pratt & Cady Division)

Valves, Butterfly
* Chapman Valve Mfg. Co.
* Crane Co.
Lunkenheimer Co.
* Pittsburgh Valve, Fdry. & Const. Co.
* Schutte & Koerting Co.

Valves, Check
* American Schaeffer & Budenberg Corp'n
* Bowser, S. F. & Co. (Inc.)
* Chapman Valve Mfg. Co.
* Crane Co.
* Crosby Steam Gage & Valve Co.
* Jenkins Bros.
Kennedy Valve Mfg. Co.
Lunkenheimer Co.
* Nordberg Mfg. Co.
* Pittsburgh Valve, Fdry. & Const. Co.
* Reading Steel Casting Co. (Inc.) (Pratt & Cady Division)
* Schutte & Koerting Co.
* Vogt, Henry Machine Co.
* Worthington Pump & Machinery Corp'n

Valves, Chronometer
* Foster Engineering Co.

Valves, Combined Back Pressure Relief
* Foster Engineering Co.

Valves, Diaphragm
* Foster Engineering Co.

Valves, Electrically Operated
* Chapman Valve Mfg. Co.
* Dean, Payne (Ltd.)
* General Electric Co.
Golden-Anderson Valve Specialty Co.
Kennedy Valve Mfg. Co.
Lunkenheimer Co.
* Pittsburgh Valve, Fdry. & Const. Co.
* Reading Steel Casting Co. (Inc.) (Pratt & Cady Division)
* Schutte & Koerting Co.

Valves, Exhaust Relief
* Cochrane Corp'n
* Crane Co.
* Foster Engineering Co.
* Jenkins Bros.
* Kieley & Mueller (Inc.)
* Pittsburgh Valve, Fdry. & Const. Co.
* Schutte & Koerting Co.
* Wheeler, C. H. Mfg. Co.
* Wheeler Cond. & Engrg. Co.

Valves, Float
* American Schaeffer & Budenberg Corp'n
* Crane Co.
* Dean, Payne (Ltd.)
* Foster Engineering Co.
Golden-Anderson Valve Specialty Co.
* Kieley & Mueller (Inc.)
* Mason Regulator Co.
* Pittsburgh Valve, Fdry. & Const. Co.
* Schutte & Koerting Co.
* Simplex Valve & Meter Co.

Valves, Foot
* Crane Co.
* Pittsburgh Valve, Fdry. & Const. Co.
* Worthington Pump & Machinery Corp'n

Valves, Fuel Oil Shut-off
* Tagliabue, C. J. Mfg. Co.

Valves, Gate
* Chapman Valve Mfg. Co.
* Crane Co.
* Jenkins Bros.
Kennedy Valve Mfg. Co.
Lunkenheimer Co.
* Pittsburgh Valve, Fdry. & Const. Co.
* Reading Steel Casting Co. (Inc.) (Pratt & Cady Division)
* Schutte & Koerting Co.

Valves, Globe, Angle and Cross
* Bowser, S. F. & Co. (Inc.)
* Crane Co.
* Crosby Steam Gage & Valve Co.
Golden-Anderson Valve Specialty Co.
* Jenkins Bros.
Kennedy Valve Mfg. Co.
Lunkenheimer Co.
* Pittsburgh Valve, Fdry. & Const. Co.
* Reading Steel Casting Co. (Inc.) (Pratt & Cady Division)
* Vogt, Henry Machine Co.

Valves, Hose
* Chapman Valve Mfg. Co.
* Crane Co.
* Jenkins Bros.
Kennedy Valve Mfg. Co.
Lunkenheimer Co
* Reading Steel Casting Co. (Inc.) (Pratt & Cady Division)

Valves, Hydraulic
* Chapman Valve Mfg. Co.
* Crane Co.
* Crosby Steam Gage & Valve Co.
Lunkenheimer Co.
* Pittsburgh Valve, Fdry. & Const. Co.
* Reading Steel Casting Co. (Inc.) (Pratt & Cady Division)
* Schutte & Koerting Co.
* Vogt, Henry Machine Co.

Valves, Hydraulic Operating
* Chapman Valve Mfg. Co.
Kennedy Valve Mfg. Co.
Lunkenheimer Co.
* Pittsburgh Valve, Fdry. & Const. Co.
* Reading Steel Casting Co. (Inc.) (Pratt & Cady Division)
* Schutte & Koerting Co.

Valves, Non-Return
* Crane Co.
* Crosby Steam Gage & Valve Co.
* Foster Engineering Co.
Golden-Anderson Valve Specialty Co.
* Jenkins Bros.
* Kieley & Mueller (Inc.)
Lunkenheimer Co.
* Pittsburgh Valve, Fdry. & Const. Co.
* Reading Steel Casting Co. (Inc.) (Pratt & Cady Division)
* Schutte & Koerting Co.

Valves, Plug
* Chapman Valve Mfg. Co.
* Reading Steel Casting Co. (Inc.) (Pratt & Cady Division)

Valves, Pop Safety
* American Schaeffer & Budenberg Corp'n
* Ashton Valve Co.
* Crane Co.
* Crosby Steam Gage & Valve Co.
Lunkenheimer Co.

Valves, Pump
* Bowser, S. F. & Co. (Inc.)
Garlock Packing Co.
* Goulds Mfg. Co,
* Jenkins Bros.
Johns-Manville (Inc.)
* Nordberg Mfg. Co.
* United States Rubber Co.

Valves, Radiator
* American Radiator Co.
* Crane Co.
* Dean, Payne (Ltd.)
* Fulton Co.
* Jenkins Bros.
Kennedy Valve Mfg. Co.
Lunkenheimer Co.
* Reading Steel Casting Co. (Inc.) (Pratt & Cady Division)

Valves, Radiator, Packless
* American Radiator Co.
* Fulton Co.

Valves, Reducing
Elliott Co.
* Foster Engineering Co.
* Fulton Co.
Golden-Anderson Valve Specialty Co.
* Kieley & Mueller (Inc.)
* Mason Regulator Co.
Squires, C. E. Co.
* Tagliabue, C. J. Mfg. Co.

Valves, Regulating
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* American Schaeffer & Budenberg Corp'n
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* Reading Steel Casting Co. (Inc.) (Reading Valve & Fittings Div.)
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* Roebling's, John A. Sons Co.

*Catalogue data of firms marked * appear in the A.S.M.E. Condensed Catalogues of Mechanical Equipment, 1923-24 Volume*

3 figs. Effects above-mentioned are illustrated by diagrams.

Improvements. Improvements in Steam-Turbine Construction (Neuerungen im Dampfturbinenbau), R. Palm. Glückauf, vol. 60, no. 9, Mar. 1, 1924, pp. 152–156, 3 figs. Comparison of different turbine types and discussion of new possible applications; details of recent improvements in turbine and auxiliary machines, and most important improvements in condenser plants.

Metropolitan-Vickers. Recent Developments in Large Turbine Practice. World Power, vol. 1, no. 4, Apr. 1924, pp. 243–248, 6 figs. Improvements in design and construction introduced by Metropolitan-Vickers Elec. Co., tending to reduce steam consumption to minimum.

Wheels, Bucket Wear in. Bucket Wear in Modern Steam Turbine Wheels, R. M. Norstrom. Nat. Engr., vol. 28, no. 5, May 1924, pp. 214–215, 6 figs. Factors in design and construction of modern steam turbines affecting wear and efficiency of buckets. Relative advantages of pressure-stage versus velocity-stage turbines in this respect.

STEEL

Elastic Limit. High Elastic Limit of Mild Steel and Its General Applications, G. W. Barr, F. G. Martin and A. T. Wall. Engineering, vol. 117, no. 3042, Apr. 18, 1924, pp. 510–511, 4 figs. Describes new mild steel which possess very high elastic limit, and discusses some of its possibilities. Paper read before Instn. Nav. Architects. See also Engineer, vol. 137, no. 3565, Apr. 25, 1924, pp. 443–444, 4 figs.

Forging Temperature. On the Forging Temperature of Steels, Kôtarô Honda. Iron & Steel Inst.—advance paper, no. 9, for mtg. May 1924, 5 pp., 4 figs. Investigation shows that in case of carbon steels, elongation-temperature curve has generally maxima and minima, and hence in process of forging low-carbon steels it is better to take every precaution against fall of temperature to 900 deg., where elongation is at minimum; in case of carbon steels, as elongation at ordinary temperature is greater than that at 200 to 300 deg. process of slowly stretching or bending a sample at room temperature rather than at 200 to 300 deg. is safeguard against fracturing.

Grain Growth. An Occurrence of Grain Growth in Steel, A. A. Blue. Iron Age, vol. 113, no. 18, May 1, 1924, pp. 1271–1273, 8 figs. Further results of carbonizing, hardening and drawing back; comparison with double quenching and drawing; band formations.

Hardened, Fundamental Defects. Some Fundamental Defects of Hardened Steels, L. Aitchison. Am. Soc. Steel Treating—Trans., vol. 5, no. 5, May 1924, pp. 491–503, 3 figs. Deals with certain properties of fully hardened steels that can only be regarded as being of nature of defects; discusses two such defects, namely, abnormally low value of limit of proportionality (elastic limit), and instability of volume which characterizes hardened steels; gives values of limit of proportionality in different hardened steels, and shows that there is very large difference between actual stress which produces some permanent deformation in steel, and stress which is generally called yield point.

Intercrystalline Fracture. Intercrystalline Fracture in Steel, R. S. Williams and V. O. Homerberg. Am. Soc. Steel Treating—Trans., vol. 5, no. 4, Apr. 1924, pp. 399–412, 30 figs. Discusses abnormal type of failure in mild steel characterized by intercrystalline cracking and produced by action of cathodic hydrogen or caustic soda solutions; effect of hydrogen on steel under tension and action of alkaline solutions on inclusions of known chemical composition artificially introduced.

Manganese Steel. See MANGANESE STEEL.

Metallurgical Defects, Detection of. Detecting Metallurgical Defects in Steel, F. C. Thompson. Metal Industry (Lond.), vol. 24, nos. 10 and 11, Mar. 7 and 14, 1924, pp. 229–230 and 261–262, 4 figs. Methods of examination, and causes of troubles occurring.

Perforation, Effect of. Influence of the Method of punching Holes in Steel Bars (Note sur l'influence du mode de perçage des trous dans les barres en acier), A. de Marneffe. Revue Universelle des Mines, vol. 67, no. 1, Apr. 1, 1924, pp. 42–48, 7 figs. Results of tests carried out by author on samples with holes punched according to different methods, to determine effect of perforation on resistance of metal.

Stainless. Ferrous Alloys Resistant to Corrosion, B. D. Saklatwalla. Iron Age, vol. 113, no. 17, Apr. 24, 1924, pp. 1209–1213, 6 figs. Stainless iron for engineering uses; effect of adding other metals, particularly copper; direct process; future of stainless metallurgy. Paper read before Am. section of Soc. Chem. Industry.

Strip, Cleaning. Continuous Cleaning of Strip Steel. Iron Age, vol. 113, no. 19, May 8, 1924, pp. 1358–1359, 2 figs. 16-block unit of Trumbull Steel Co., Warren, O., has capacity of 50 tons per day.

STEEL CASTINGS

Cleaning-Cost Records. Keeps Record of Cleaning Costs, B. K. Price. Iron Trade Rev., vol. 74, no. 18, May 1, 1924, pp. 1165–1166 and 1169, 4 figs. Steel foundry pays grinder hands according to amount of metal removed; castings weighed before being delivered to grinder and again after being ground; production and wages stimulated.

Hawse Pipes, Leviathan. Cast Large Steel Hawse Pipe. Foundry, vol. 52, no. 10, May 15, 1924, pp. 381–384, 7 figs. To replace Leviathan's defective cast-iron hawse pipes; steel castings required to resist heavy stress.

Manufacture. Liquid Steel for Light Castings, J. A. Holden. Foundry Trade Jl., vol. 29, no. 402, May 1, 1924, pp. 367–368. Shows that "Stock" plant, in addition to turning out mild steel of good quality, can be adapted for making many types of special steels. Probable cause of porosity in electric process of manufacture.

STEEL, HEAT TREATMENT OF

Problems. Heat-treatment of Steel with Special Reference to Production, J. W. Urquhart. Machy. (Lond.), vol. 23, no. 600, Mar. 27, 1924, pp. 832–835, 6 figs. Machining difficulties with mild steels; difficulties resulting from high and deep carbon casings; typical case in carburizing steels; when double quench is necessary; micrographs; French and American high-temperature initial quenching; distinction between second quenching and hardening; destructive effect of excessive temperature; structure of carbon steel gears.

STOKERS

Efficiency, Computation of. Computing Guaranteed Stoker Efficiency, H. F. Gauss. Power, vol. 59, no. 21, May 20, 1924, pp. 813–815, 1 fig. Computing stoker efficiency for given fuel, with discussion of various factors entering into problem; typical examples and convenient charts to facilitate work.

Types. Stokers an Essential of Power Plant Economy. Power House, vol. 17, no. 8, Apr. 20. 1924, pp. 24–31, 8 figs. Reasons, from manufacturers of principal types in use in Canada, for reduction in fuel costs and increase in efficiency of "mechanical firemen" effect.

STREET RAILWAYS

Cars. Rear Exit Expedites Passenger Movement. Elec. Ry. Jl., vol. 63, no. 18, May 3, 1924, pp. 693–695, 5 figs. Describes one-man double-truck lightweight cars recently placed in service in Fort Wayne by Indiana Service Corp.; rear exit and inclosed steps.

STRESSES

Internal. Internal Stresses Rendered Visible (Les tensions intérieures rendus visibles), A. Mesnager. Technique Moderne, vol. 16, no. 6, Mar. 15, 1924, pp. 161–171, 52 figs. Discusses method based on theory of polarization which permits accurate measurements of internal stresses of a solid; applications of method.

SUPERHEATERS

Radiant-Heat. Operation of Radiant Heat Superheaters. Power Plant Eng., vol. 28, no. 10, May 15, 1924, pp. 528–529, 1 fig. Steam temperature varies slightly with percentage of CO_2; advantages of two-stage superheating.

T

TERMINALS, LOCOMOTIVE

Richmond, Va. Electrical Equipment at New Engine Terminal. Ry. Elec. Engr., vol. 15, no. 5, May 1924, pp. 135–140, 8 figs. Describes terminal of Richmond, Fredericksburg & Potomac Railroad, at Richmond, Va.

Water Supply. Water Supply of the New Genoa-Terralba Enginhouse (Impianti idrici nel nuovo deposito locomotive e locomotori di Genova-Terralba), E. D'Andrea. Rivista Tecnica delle Ferrovie Italiane, vol. 25, no. 3, Mar. 15, 1924, pp. 73–85, 12 figs. partly on supp. plates. Particulars of plant consisting of 7 driven wells, electrically driven centrifugal pumps, and twin monolithic concrete water tanks each of a capacity of 50,000 gal., and erected over a common pump house.

TESTING MACHINES

Metal Strip. Notes on the Testing of Metal Strip, L. Aitchison and L. W. Johnson. Iron & Steel Inst.—advance paper, no. 1, for mtg. May 1924, 15 pp., 13 figs. Bend-testing machine; proof stress testing; simple proof stress extensometer. See (abstract) in Iron Trade Rev., vol. 74, no. 21, May 22, 1924, pp 1361–1364, 5 figs.

TEXTILE MACHINERY

Looms. Textile Machinery. Engineering, vol. 117, no. 3043, Apr. 24, 1924, pp. 549–550, 4 figs. Describes exhibits of Rob. Hall & Sons at Brit. Empire Exhibition, including automatic loom, belt loom for production of cotton, camel hair or hemp driving belts, loom for making horse-hair cloth, and cloth-folding and measuring machine.

TINNING

Thickening of Hot Molten Tin. Origin and Prevention of the Formation of Undesirable Thickening of Hot Molten Tin (Ensttehung und Verhütung schädlicher Verdickungen bezw. Legierungen feuerflüssiger Zinnbäder), B. Haas. Zeit. für die Gesamte Giessereipraxis, vol. 45, no. 15, Apr. 12, 1924, pp. 33–34. Molten tin combines with iron, forming an alloy that thickens tin bath, impairs process of tinning, and wastes metal. It is recommended to tin vessels containing tin bath and to pickle and preheat articles to be tinned.

TRANSPORTATION

Factory. Shop Transportation Economics, S. M. Lowry. Mgt. & Administration, vol. 7, no. 5, May 1924, pp. 533–538, 6 figs. Westinghouse Elec. & Mfg. Co.'s methods and results.

Railway. The Place of Railway Transportation in the American Industrial Structure. Inst. Transport—Jl., vol. 5, no. 5, Mar. 1924, pp. 230–237. Report of Research Council of Nat. Transportation Inst, setting forth place of railway transportation in economic structure of America.

TUBES

Solid-Wall, Manufacture of. Making Solid Wall Tubes of Strip Steel. Iron Age, vol. 113, no. 19, May 1, 1924, pp. 1293–1294, 2 figs. New methods of manufacturing brass, copper and steel tubing by continuous process developed by Bundy Tubing Co., Detroit; material wide enough to give double thickness of wall; tinned before rolling; walls soldered together by heat.

U

UNEMPLOYMENT

Seasonal. The Problem of Seasonal Unemployment in the Building Industry, Wm. S. Parker. Int. Labour Rev., vol. 9, no. 3, Mar. 1924, pp. 361–371. Indicates economic and civic waste involved in leaving building labor idle for several months in year and considers chief causes of seasonal unemployment.

V

VISCOSIMETERS

Mercurial. A Mercurial Viscosimeter Compensated for Density, F. M. Lidstone. Chem. & Industry, vol. 43, no. 14, Apr. 4, 1924, pp. 87T-88T, 1 fig. Describes apparatus which is modified form of viscosimeter described in previous issues of same journal.

W

WATER HAMMER

Moderating Effects of. Water Hammer (Il colpo d'ariete), G. B. Ugolini. Annali dei Lavori Pubblici, vol. 62, nos. 1 and 2, Jan. and Feb. 1924, pp. 7–57 and 101–130, 51 figs. partly on supp. plates. Extended study describing methods for lessening its harmful effects in pipe lines and means for utilizing it in form of sonic waves for power transmission.

WATER POWER

Steam and, Relative Costs of. Relative Cost of Water and Steam Power. Power, vol. 59, no. 21, May 20, 1924, pp. 827–828. Construction costs and fixed charges for water plant are as a rule twice as great as for steam plant and overbalance smaller operating expense; steam plant has greater reserve capacity and is in position to render better and safer service.

Sweden. Swedish Water-Power Resources and Their Utilization (Schwedens Wasserkräfte und deren Ausnutzung), F. V. Hansen. Zeit. des Vereines deutscher Ingenieure, vol. 68, no. 14, Apr. 5, 1924, pp. 321–327, 13 figs. Water-power resources are estimated at 10,000,000 hp. for six months of year; present status of utilization and estimated power requirements; technical details of more important hydroelectric plants.

WELDING

Chemical Aspects. Some Chemical Aspects of Welding, J. R. Booer. Inst. Mar. Engrs.—Trans., Mar. 1924, pp. 642–659, 2 figs. It is shown that crux of chemical aspect is removal and prevention of foreign inclusions in welds, which are chief cause of failures.

Electric. See ELECTRIC WELDING; ELECTRIC WELDING, ARC.

Fluxes and Slags in. Fluxes and Slags in Welding, W. Sraragen. Am. Welding Soc.—Jl., vol. 3, no. 4, Apr. 1924, pp. 36–47. Digest of opinions of experts in America on action of these fluxes in electric arc, gas and resistance welding. Paper to be presented before joint session of Faraday Soc. and Inst. Metals.

Oxy-Acetylene. See OXY-ACETYLENE WELDING.

Welding Metal, High-Carbon. High Carbon Welding Metal, C. A. McCune. Am. Welding Soc.—Jl., vol. 3, no. 3, Mar. 1924, pp. 22–33, 16 figs. Results of experiments made in connection with high-carbon welding materials.

WELDS

Flexibility vs. Rigidity. Design of Welds—Flexibility Versus Rigidity. Am. Welding Soc.—Jl., vol. 3, no. 4, Apr. 1924, pp. 15–27, 3 figs. Contains five short papers giving views of experts in each of the welding fields as to whether a weld in a structure should be designed more rigid or flexible than parts which it joins: Carbon Arc Welding, J. C. Lincoln; Gas Welding, S. W. Miller; Metal Arc Welding, C. J. Holslag; Resistance Welding, H. A. Woofter; and Thermit Welding, J. H. Deppeler.

WOOD

Soft, Microscopic Structure. Microscopic Structure of Softwood. Eng. News-Rec., vol. 92, no. 20, May 15, 1924, p. 861, 1 fig. Presents drawing of cell structure of minute block of softwood.

WOOD PRESERVATION

Paint as Preservative. Does Paint Preserve Wood?, H. D. Tiemann. Sci. Am., vol. 130, no. 5, May 1924, pp. 314–315, 6 figs. Points out that paint is not proof against gradual absorption of moisture and will not prevent swelling or shrinkage, but it retards rate of absorption or loss of moisture through surface, thus giving time for partial equalization of moisture and reduction of moisture gradient within piece.

WOODWORKING PLANTS

Lumber Conservation. Ford Upsets Precedents in Interest of Lumber Conservation. Automotive Industries, vol. 50, no. 16, Apr. 17, 1924, pp. 866–867, 4 figs. System employed at saw mills and woodworking plants of Ford Motor Co.; body parts are cut from unedged green slabs and are kiln-dried afterward; crooked logs, swell at butt and even branches 4 in. or more in diam., formerly discarded, are now utilized effectively.

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THE ENGINEERING INDEX

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THE ENGINEERING INDEX presents each month, in conveniently classified form, items descriptive of the articles appearing in the current issues of the world's engineering and scientific press of particular interest to mechanical engineers. At the end of the year the monthly installments are combined along with items dealing with civil, electrical, mining and other branches of engineering, and published in book form, this annual volume having regularly appeared since 1906. In the preparation of the Index by the engineering staff of The American Society of Mechanical Engineers some 1200 technical publications received by the Engineering Societies Library (New York) are regularly reviewed, thus bringing the great resources of that library to the entire engineering profession.

Photoprint copies (white printing on a black background) of any of the articles listed in the Index may be obtained at a price of 25 cents a page. When ordering photoprints identify the article by quoting from the Index item: (1) Title of article; (2) Name of periodical in which it appeared; (3) Volume, number, and date of publication of periodical; (4) Page numbers. A remittance of 25 cents a page should accompany the order. Orders should be sent to the Engineering Societies Library, 29 West 39th Street, New York.

(See also page 510 of this issue for supplementary items.)

AERONAUTICAL INSTRUMENTS

Wind Measurement. Objective Wind Measurement in Aircraft (Ueber objektive Windmessung im Luftfahrzeuge), H. Boykow. Zeit. für Flugtechnik u. Motorluftschiffahrt, vol. 15, no. 5–6, Mar. 26, 1924, pp. 40–42, 4 figs. Describes instrument, constructed by Goerz Works for airship oversea flight to America and for the Amundsen transpolar flight, which measures simultaneously luff angle and speed above ground.

AIR COMPRESSORS

Portable. Portable Compressors, F. A. McLean. Can. Min. Jl., vol. 45, no. 21, May 23, 1924, pp. 503–506, 5 figs. Notes on their use in mining and contracting.

AIRCRAFT CONSTRUCTION MATERIALS

Dopes and Fabric. Dopes and Fabric, J. E. Ramsbottom. Roy. Aeronautical Soc.—Jl., vol. 28, no. 161, May 1924, pp. 273–305 and (discussion) 305–314, 16 figs. Deals with dopes and fabric as far as they relate to problem of production of structural covering for aircraft which will maintain its tautness under varying conditions of humidity and also retain its strength after prolonged weathering.

Light Metals. The Non-Ferrous Metals with Special Regard to Airplanes (Die Nichteisenmetalle unter besonderer Berücksichtigung der Luftfahrzeuge), E. H. Schulz. Zeit. des Vereines deutscher Ingenieure, vol. 68, no. 22, May 31, 1924, pp. 545–550, 5 figs. Importance of light metals and alloys for construction of aircraft; properties and treatment; pure aluminum; duralumin; other alloys; cast aluminum alloys; silumin; magnesium alloys; electron metal; future prospects.

AIRPLANE ENGINES

Bristol Cherub. The New Bristol Cherub. Aeroplane, vol. 26, no. 23, June 4, 1924, pp. 474 and 476, 3 figs. Is of two-cylinder opposed type and has total cylinder capacity of just under 1100 cc.; bore 3.35 in., stroke 3.80 in., piston displacement 66.8 cu. in., normal output 22 b.hp. at 2500 r.p.m., maximum output 34 b.hp. at 4000 r.p.m.

British Types. British Aero Engines. Flight, vol. 16, no. 22, May 29, 1924, pp. 331–339, 24 figs. Gives particulars such as power, weight, consumption, etc., of all modern British aero engines. Brief particulars of two small engines which have been proved suitable for light airplanes, and of one engine which is as yet experimental.

Fuel Pump. The Bellows (Sylphon) Fuel Pump for Liberty "12" and Wright "H" Engines, H. C. Osborne. Air Service Information Circular, vol. 5, no. 458, Mar. 15, 1924, 6 pp., 6 figs. Description of pump; overhaul; installation; precautions.

German Development. The Development of Airplane Engines Since the War (Die Entwicklung des Flugmotors seit dem Kriege), H. Baer. Zeit. des Vereines deutscher Ingenieure, vol. 68, no. 22, May 31, 1924, pp. 539–544, 11 figs. Summary of types developed since war in Germany; construction parts, such as cylinders, pistons, bearings, lubrication, steering, ratio of compression, maximum cylinder dimensions, etc.; the light airplane engine.

Sample Tests. Sample Tests of Aircraft Engines (Musterprüfungen von Flugmotoren), Rich. Roth. Zeit. für Flugtechnik u. Motorluftschiffahrt, vol. 15, no. 7–8, Apr. 26, 1924, pp. 57–61, 6 figs. Brief outline of test regulations for aircraft engines and examples showing how they are carried out.

Stedman Two-Stroke. A Novel Type of Two-Stroke. Flight, vol. 16, no. 17, Apr. 24, 1924, pp. 238, 5 figs. Describes engine patented and invented by L. B. Stedman which, in its simplest form, consists of a V-twin, in which one cylinder draws its charge from crankcase, while other is supplied initially from crankcase, but via a chamber surrounding crankcase.

Wright T-3. The Wright T-3 Engine. Aeroplane, vol. 26, no. 22, May 28, 1924, pp. 455 and 458, 4 figs. Twelve-cylinder V-type with an angle of 60 deg. between cylinders. Bore 5¼ in., stroke 6¼ in. piston displacement 1947 cu. in., normal output 600, normal speed 1900.

AIRPLANE PROPELLERS

Slipstream Theory. The Slipstream Theory in Its Practical Application (Die Strahltheorie in ihrer praktischen Anwendung), Wm. Hoff. Zeit. für Flugtechnik u. Motorluftschiffahrt, vol. 15, no. 7–8, Apr. 26, 1924, pp. 51–53, 4 figs. Study of slipstream theory as basis for air-propeller dimensioning.

AIRPLANES

Aileron Displacement, Effect of. On the Distribution of Lift Along the Span of an Airfoil with Displaced Ailerons, M. M. Munk. Nat. Advisory Committee for Aeronautics—Tech. Notes, no. 195, June 1924, 8 pp., 4 figs. Effect of aileron displacement on distribution of lift along span is computed for elliptic wing of aspect ratio 6 for three conditions.

Aileron Efficiency. Aileron Effectiveness, A. L. Morse. Air Service Information Circular, vol. 5, no. 454, Mar. 15, 1924, 8 pp., 19 figs. Wind-tunnel tests of U. S. A.-35 (half-span) airfoil to determine aerodynamic efficiency of ailerons, hinge lines of which were skewed at various angles with transverse or *y*-axis.

Beams, Form Factors. Form Factors of Beams Subjected to Transverse Loading Only, J. A. Newlin and G. W. Trayer. Nat. Advisory Committee for Aeronautics—Report, no. 181, 1924, 19 pp., 8 figs. Tests to determine factors to apply to usual beam formula in order that properties of wood based on tests of rectangular sections might be used as basis of design for beams of any section, and to develop formulas for determining such factors.

Civil. British Civil Aircraft. Flight, vol. 16, no. 22, May 29, 1924, pp. 327–331, 3 figs. partly on pp. 324–325. Illustrates and describes commercial, racing, and school machines.

Climbing. The Climbing Ability of Airplanes (Die Steigleistungen von Flugzeugen), P. Brenner. Zeit. für Flugtechnik u. Motorluftschiffahrt, vol. 15, no. 7–8, Apr. 26, 1924, pp. 61–65, 3 figs. New formula for calculation of climbing time, with aid of which, with known ceiling and engine performance, theoretical climbing curve of airplane can be found.

Corps Observation. Notes on the Design of a Corps Observation Plane, H. F. Marshall. Aviation, vol. 16, no. 21, May 26, 1924, pp. 561–563, 2 figs. Exhaust silences is said to be desirable; cockpit arrangement; provision for overload; cruising range; landing speed; reporting on observation.

Daimler L. 15. The Daimler L. 15. Flight, vol. 16, no. 19, May 8, 1924, pp. 263–265, 6 figs. Description of a German two-seater light plane, with motorcycle engine of 7–9 rated hp.; wing span, 41 ft. 4 in.

Design, Technical Applications. Aviation and Technology (Luftfahrt und Technik), E. Everling. Zeit. des Vereines deutscher Ingenieure, vol. 68, no. 20, May 17, 1924, pp. 491–492, 2 figs. Points out that aircraft construction may be considered as light construction, that is, it is characterized by weight economy in design, material and power plant; applications of aircraft technology to other fields of engineering, especially to automobile construction, in which great advantages have resulted from light construction; Rumpler streamline automobile is cited as example; results for industry and academic instruction.

Dietrich-Gobiet. The Dietrich-Gobiet Sport Monoplane. Flight, vol. 16, no. 21, May 22, 1924, pp. 286–287, 3 figs. A German "Ford of the air." Length overall 17 ft. 8½ in., span 26 ft. 3 in., height 6 ft. 5 in., weight empty 396 lb., useful load 352 lb.; 30–35-hp. 2-cylinder opposed air-cooled Haacke engine.

Economy Tests. Economy Test of the DH-4, W. F. Gerhardt and Rob. Anderson. Air Service Information Ciruclar, vol. 5, no. 461, Apr. 1, 1924, 4 pp., 3 figs. Following development of satisfactory flowmeter installation for airplanes, application was made to determine economical operating conditions of DH-4; attempt to check results of previous economy tests, to ascertain effect of altitude adjustment, and to confirm theory of economical operation previously developed.

Ehrlich V. The Ehrlich V. Flight, vol. 16, no. 20, May 15, 1924, pp. 277, 1 fig. Notes on a new passenger airplane produced by Zentral Aviatik & Automobil Ges. M.B.H. of Vienna; span 32 ft. 10 in., length 22 ft., wing area 333.5 sq. ft.; 6-cylinder vertical "Hiero" engine rated at 180/200 b.hp.

Fiat. The Fiat "C. R.," "R. S." and "B. R." Biplanes. Flight, vol. 16, no. 20, May 15, 1924, pp. 273–274, 4 figs. Brief particulars of three recent Italian military machines constructed by Fiat Co., of Turin. "C. R." and "R. S." fitted with 300-hp. Hispano-Suiza engine, and "B. R." with 700-hp. Fiat A-14 engine.

Flap-Gear. The De Havilland Automatic Flap Gear. Aeroplane, vol. 26, no. 18, Apr. 30, 1924, p. 368, 5 figs. Differs from other types in that there is no additional operating gear involved and flaps are entirely automatic in their action. Flaps are exactly like normal ailerons, except that they extend over whole span of wings. Effect on machine when this gear was fitted to a D. H. 50 airplane.

Gliders. Gliders: Their History and Uses, W. H. Sayers. Roy. Aeronautical Soc.—Jl., vol. 28, no. 161, May 1924, pp. 315–322. Review of development and discussion of possibilities.

Handley Page W8.F. The Handley Page W8.F. Aeroplane, vol. 26, no. 18, Apr. 30, 1924, pp. 370, 372 and 374, 8 figs. Fitted with one Rolls-Royce Eagle IX engine of 360 hp. in nose of fuselage, and two Siddeley Puma engines each of 240 hp. on wings; span 75 ft., length 60 ft. 1 in., height 17 ft., wing area 1456 sq. ft., loaded weight 12,000 lb., max. speed 102 m.p.h. See also Flight, vol. 16, no. 18, May 1, 1924, pp. 248–253, 17 figs.

Light. Light Airplane Construction (Leichtbau), A. Baumann. Zeit. des Vereines deutscher Ingenieure, vol. 68, no. 22, May 31, 1924, pp. 551–555. Deals with materials, design stress and arrangement conducive to light-weight construction; advantages and disadvantages of light construction and useful field. See also following article, pp. 555–556, 3 figs., entitled The Selection of Materials for Light Construction (Die Frage des Baustoffes im Leichtbau), P. Meyer.

Metal. Development and Design of Dornier Metal and All-Metal Airplanes (Entwicklung und Konstruktion der Metall- und Ganzmetallflugzeuge von Dornier), H. Werner. Motorwagen, vol. 27, no. 14, May 20, 1924, pp. 246–248, 8 figs. Comparison with development of Junkers planes.

Military. British Military Aircraft. Flight, vol.

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Nore.—The abbreviations used in indexing are as follows:

Academy (Acad.)
American (Am.)
Associated (Assoc.)
Association (Assn.)
Bulletin (Bul.)
Bureau (Bur.)
Canadian (Can.)
Chemical or Chemistry (Chem.)
Electrical or Electric (Elec.)
Electrician (Elecn.)
Engineer[s] (Engr.[s])
Engineering (Eng.)
Gazette (Gaz.)
General (Gen.)
Geological (Geol.)
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Institution (Instn.)
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Classified List of Mechanical Equipment

Manufactured by Firms Represented in MECHANICAL ENGINEERING

FOR ALPHABETICAL LIST OF ADVERTISERS, SEE PAGE 150

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16, no. 22, May 29, 1924, pp. 306–327, 52 figs. Illustrates and describes land machines and seaplanes designed for warlike operations.

Prague Show. The Aero Show at Prague. Flight, vol. 16, no. 23, June 5, 1924, pp. 356–365, 19 figs. General descriptions and illustrations of machines at Third International Exhibition.

Seaplanes. See SEAPLANES.

Wind-Tunnel Tests. Wind Tunnel Test of the Original TA-4 with the Following Airfoils: USA-27C Large, USA-27C Small, Gottingen 387 and Gottingen 255, A. L. Morse. Air Service Information Circular, vol. 5, no. 455, Mar. 15, 1924, 27 pp., 31 figs. Test to determine aerodynamic characteristics.

Wind Tunnel Test of CO-2A Model Airplane, C. E. Archer. Air Service Information Circular, vol. 5, no. 453, Mar. 15, 1924, 17 pp., 12 figs. Results of test to obtain full data on lift, drag, L/D, and moment curve about center of gravity for angles from below zero lift to above maximum lift (with and without tail plane and with and without elevator).

AIRSHIPS

Schütte-Lanz Light Construction. Light Construction of the Schütte-Lanz Airships (Leichtkonstruktion des Luftschiffbaus Schütte-Lanz), Gentzcke. Zeit. für Flugtechnik u Motorluftschiffahrt, vol. 15, no. 9, May 15, 1924, pp. 77–95, 73 figs. Application, improvement, treatment, strength, weight and qualities of construction materials; beams and joints of metal construction; beams and joints of wood construction.

Speed of. Speed of Airships with Minimum Fuel Consumption (Die Geschwindigkeit geringsten Brennstoffverbrauchs bei Luftschiffen), W. Bleistein. Zeit. für Flugtechnik u. Motorluftschiffahrt, vol. 15, no. 5–6, Mar. 26, 1924, pp. 42–44, 4 figs. Critical discussion of rule-of-thumb formulas developed by Munk and described in Nat. Advisory Committee Tech. Note, no. 89.

Zeppelin, LZ, 126. The Zeppelin L. Z. 126 (Le Zeppelin L. Z. 126), M. Foerster. Bul. Technique du Bur. Veritas, vol. 6, no. 2, Feb. 1924, pp. 24–27, 7 figs. Characteristics and general design; nacelles; engines; rudders; passenger and crew facilities; nautical instruments. Translated from Werft-Reederei-Hafen, Nov. 22, 1923.

Twenty-Five Years of Zeppelin Airship Construction (Fünfundzwanzig Jahre Zeppelin-Luftschiffbau), L. Dürr. Zeit. des Vereines deutscher Ingenieure, vol. 68, no. 22, May 31, 1924, pp. 529–537, 31 figs. Details of airship LZ 126 built by Zeppelin Co. for the United States; deals with body of ship, machinery, propellers, gasoline storage, ballast, pilot's nacelle, electric lighting, landing gear, etc.

V. Z.-24. The French Zodiac Dirigible "Vedette." Flight, vol. 16, no. 22, May 29, 1924, p. 300, 3 figs. Particulars of V. Z. 24, airship of non-rigid type; capacity 141,280 cu. ft., overall length 190 ft. 6 in., overall diameter 38 ft. 9 in., weight empty 6670 lb., useful load 2944 lb., speed range 49.6–52.7 m.p.h.

ALIGNMENT CHARTS

Mathematical Principles. The Mathematical Fundamentals of Nomography (Ueber die mathematischen Grundlagen der Nomographie), L. Bieberbach. Zeit. des Vereines deutscher Ingenieure, vol. 68, no. 20, May 17, 1924, pp. 495–498, 7 figs. Mathematical principles of alignment charts in simple and somewhat more complicated cases; suggestions for further developments.

Reinforced Concrete. Nomography in Reinforced Concrete Calculation (Nomographie in der Eisenbetonrechnung), Rob. Jacki. Beton u. Eisen, vol. 23, no. 7, Apr. 5, 1924, pp. 77–82, 17 figs. It is shown how different frequently occurring calculations can be greatly accelerated with aid of alignment charts which can be easily plotted by any engineer.

ALLOY STEELS

Development. Alloy Steel Development Rapid, Rob. Hadfield. Iron Trade Rev., vol. 74, no. 25, June 19, 1924, pp. 1627–1628, 1 fig. Traces steps in progress in making of alloy steels; advance from 1882 to present time hastened by increase in volume of research work. (Abstract.) Paper read before Brit. Empire Min. & Met. Congress.

ALLOYS

Aluminum. See ALUMINUM ALLOYS; DURALUMIN.

Light. See AIRCRAFT CONSTRUCTION MATERIALS, Light Metals.

Nickel. See NICKEL ALLOYS.

ALUMINUM

Castings. The Production of Aluminum Castings (Die Herstellung von Aluminiumguss), von Zeerleder. Metall u. Erz, vol. 21, no. 5, 1st Mar. issue, 1924, pp. 99–101. Describes recommendable working methods in aluminum foundries; melting arrangements; treatment of metal and production of molds.

Melting, Use of Fluxes in. The Use of Fluxes in the Melting of Aluminium and its Alloys, W. Rosenhain and S. L. Archbutt. Foundry Trade Jl., vol. 29, no. 405, May 22, 1924, pp. 427–428. Paper read at symposium arranged by Faraday Soc., Inst. Metals, Inst. British Foundrymen and Non-Ferrous Research Assn.

Properties. Investigations of the Properties of Aluminum (Recherches faites au Laboratoire central d'Electricité sur les propriétiés de l'aluminium), M. Jouaust. Société Française des Electriciens—Bul., vol. 3, no. 30, Dec. 1923, pp. 663–669. Results of investigations carried out at Central Laboratory of Electricity on samples of French, American and English aluminum.

Soldering. Can Aluminum Be Soldered? (Ist Aluminium lötbar), F. Roberti. Automobil-Rundschau, vol. 23, no. 2, Feb. 1924, pp. 17–18, 4 figs. Describes aluminum soldering process, known as Conti process, which is result of many years' experimentation in special field of homogeneous aluminum jointing; examples are cited showing advantages of process.

ALUMINUM ALLOYS

Aluminum-Copper. The Heat Treatment of Light Alloys of Aluminum with Copper Base (Le traitement thermique des alliages légers d'aluminium à base de cuivre), A. Portevin and F. Le Chatelier. Revue de Métallurgie, vol. 21, no. 4, Apr. 1924, pp. 233–246, 14 figs. Gives characteristics of alloys containing magnesium and those containing no magnesium, and describes new process of heat-treating alloys without magnesium; influence of hardening temperature; mechanical properties of alloys, etc.; summary of advantages of alloy without magnesium. Bibliography.

Duralumin. See DURALUMIN.

Metallography. Metallography of Sand Cast Aluminum Alloys, A. J. Lyon and S. Daniels. Air Service Information Circular, vol. 5, no. 449, Mar. 1, 1924, 19 pp., 54 figs. Defines technique employed in metallography of aluminum and its alloys by Material Section, Engng. Div. Air Service; illustrates and describes common constituents and characteristic microstructure of cast-aluminum alloys used by Air Service.

Production. History of Light Aluminum Alloys and Actual Status of Their Production (Historique des alliages légers d'aluminium et état actuel de leur fabrication), L. Guillet. Génie Civil, vol. 84, nos. 13, 14 and 15, Mar. 29, Apr. 5 and 12, 1924, pp. 298–303, 319–321 and 356–359, 9 figs. Traces history of development and describes latest improvements.

AMMONIA

By-Product. By-Product and Synthetic Ammonia. Gas Engr., vol. 40, nos. 574 and 575, Feb. and Mar. 1924, pp. 24–25 and 48–49. Account and criticism of modern methods of by-product ammonia production. Discusses potential ammonia in coal, ammonia per ton carbonized, excessive addition of lime, heat-interchange devices, and ammonium bicarbonate and chloride and their possibilities as commercial fertilizers.

Synthetic. Catalyst Bombs for Synthetic Ammonia Production, E. K. Scott. Chem. Age (Lond.), vol. 10, no. 256, May 10, 1924, pp. 482–483, 3 figs. Describes Haber-Bosch, Claude, and Casale catalyst bombs; catalyst material.

Synthesis of Ammonia at High Pressures (Ueber die Ammoniaksynthese bei hohen Drucken), W. Moldenhauer. Chemiker-Zeitung, vol. 48, no. 46, Apr. 15, 1924, pp. 233–234, 1 fig. Yield of synthetic ammonia obtained by Claude at very high pressures are compared with theoretical yields deduced from Haber's ammonia equilibrium formula; discrepancies between actual yields obtained and theoretical yields of ammonia increase as temperature falls and as pressure rises; they are probably due to differences in compressibilities of ammonia and of more permanent gases, nitrogen and hydrogen.

Temperature-Entropy Chart. Temperature-Entropy Chart for Ammonia, W. M. Griffith. Ice & Refrigeration, vol. 66, no. 5, May 1924, pp. 462–465, 3 figs. Description of a new temperature-entropy chart based on Bur. of Standards ammonia tables. Construction of chart; diagram to illustrate use of chart; solution of practical problems by means of data from new diagram.

AMMONIA CONDENSERS

Superheat at. Superheat at the Condenser, J. E. Starr. Ice & Refrigeration, vol. 66, no. 5, May 1924, pp. 461–462. Discussion of determination of amount of superheat in ammonia at condenser; effect of power requirements; a possible way of utilizing superheat by absorption system; means of reducing superheat.

APPRENTICES, TRAINING OF

Coöperative Plan. Making the Skilled Mechanic of Tomorrow, F. A. Pope. Indus. Mgt. (N. Y.), vol. 67, no. 6, June 1924, pp. 363–367, 5 figs. Cooperative plan for apprentice training in metal trades, developed by Nat. Metal Trades Assn.

Draftsmen and Patternmakers. Training Draftsmen and Patternmakers. Machy. (N. Y.), vol. 30, no. 10, June 1924, pp. 787–789, 4 figs. Outline of courses given at Worcester Boys Trade School.

France. The Training of Apprentices (L'Apprentissage). Société des Ingenieurs Civils—Mémoires et Compte Rendu des Travaux, vol. 76, no. 10–12, Oct.-Dec. 1923, pp. 1172–1281. Account of what has been accomplished in 13th Ward of Paris, by Ch. Quillard; laws and organization of Syndicate of Mechanics, Boiler Makers and Foundrymen with regard to training of apprentices and vocational instruction, J. Quantin; training of apprentices from pedagogical viewpoint, M. Loffet; training of shop apprentices in its relation to rational organization of work, J. Androuin; rapid development of apprenticeship, M. Lacoin; the crisis in apprenticeship and its remedy, and technical instruction, J. Hiernaux; training of apprentices at steel works of Schneider, Jaquet & Cie, Strasbourg, and Cockerill Works, Belgium, E. Kern; theoretical vocational training and education during period of apprenticeship, M. Bostsarron; apprenticeship in the electrotechnical industry, Geo. Westercamp; school for training of apprentices at works of Dion-Bouton M. Winder.

Patternmakers and Molders. Modern Apprenticeship Training of Patternmakers and Molders (Neuzeitliche Ausbildung der Modelltischler- und Formerlehrlinge), R. Harm. Giesserei-Zeitung, vol. 21, no. 7, April 1, 1924, pp. 135–140, 6 figs. Development of industrial training of apprentices, and of so-called DATSCH charts worked out by German Committee for Technical Education; DATSCH instruction courses and their practical application.

Railways. Training Apprentices, H. L. Shipman. Car Foremen's Assn.—Proc., vol. 18, no. 7, Apr. 1924, 15 pp. between pp. 12 and 52 (including discussion). Basic elements that must be given consideration before an apprenticeship system is undertaken by a railroad. Suggestions regarding establishment of system and training of apprentices.

AUTOMOBILE ENGINES

Constant-Compression. Economy of Fuel Attained by Means of Constant Compression Engine. Automotive Industries, vol. 50, no. 24, June 12, 1924, p. 1278, 1 fig. Gas mixture and air are drawn in successively so that they will remain on different levels of combustion chamber, and so that stratification replaces turbulence of charge in Burtnett 4-cycle engine.

Eight-in-Line. Falls Eight-in-Line Has Crankcase and Cylinders Cast Integral. Automotive Industries, vol. 50, no. 22, May 29, 1924, pp. 1182–1183, 2 figs. Valve in head-type engine has five-bearing crankshaft lubricated by pressure, integral inlet manifold, and two additional cylinders have same bore and stroke as six of same make.

Godet-Vareille. A Diminutive "Six." Autocar, vol. 52, no. 1492, May 23, 1924, pp. 935–936, 6 figs. Six-cylinder 745 cc. Godet-Vareille engine; outstanding features are positive valve operating mechanism, a supercharger, distinctive type of cylinder construction, and use of roller and ball bearings.

Two-Cycle. Two-Cycle Engines (Dolf, Bekamo, Garelli), C. Hanfland. Motorwagen, vol. 27, no. 14, May 20, 1924, pp. 239–242, 13 figs. Describes three types of 2-cycle engines, namely, the Dolf, Bekamo and Garelli engines.

AUTOMOBILE INDUSTRY

S. A. E. Standards Report. Standards Committee Division Reports. Soc. Automotive Engrs.—Jl., vol. 14, no. 6, June 1924, pp. 625–640, 15 figs. Gives following Division Reports: Parts and fittings; agricultural power equipment; ball and roller bearings; lighting; non-ferrous metals; screw threads; springs.

AUTOMOBILE MANUFACTURING PLANTS

Machine Tools for. Large Fixtures and Tools for Building Twin City Tractors, H. Campbell. Am. Mach., vol. 60, no. 25, June 19, 1924, pp. 907–910, 13 figs. Details of operations on large automotive units at plant of Minneapolis Steel & Machy. Co., Minneapolis.

AUTOMOBILES

Albatros. The 8 H.P. Albatros Car. Auto-Motor Jl., vol. 29, no. 19, May 8, 1924, pp. 393–395, 10 figs. British-built car. Four-cylindered monobloc engine built up as one unit with clutch case and gear box and an entirely enclosed propeller shaft in a tubular torque member transmits power to newly designed rear live axle.

Amsterdam Show. The Automobile Show in Amsterdam, Holland, February, 1924 ("De Teotoonstelling van Automobilen" in Amsterdam), W. Hirschfeld. Motorwagen, vol. 27, nos. 10, 11 and 12, Apr. 10, 20 and 30, 1924, pp. 161–166, 179–183 and 206–209, 37 figs. Details of most important exhibits of automobiles, motor trucks and auxiliary parts.

Armstrong-Siddeley. The 14 H. P. Armstrong-Siddeley. Auto-Motor Jl., vol. 29, no. 21, May 22, 1924, pp. 435–437, 11 figs. A roomy family touring car; four cylinders; speed, efficiency and economy.

Beardmore. The 12.30 H. P. Beardmore Car. Auto-Motor Jl., vol. 29, no. 18, May 1, 1924, pp. 367–370, 14 figs. Four-cylinder monobloc overhead valve engine, with clutch and gear integral, and a propeller shaft drive to a spiral bevel-driven silent live axle, with Hotchkiss type of torque taking semi-elliptic underslung springs.

Bodies, Assembly of. Packard Bodies Assembled in Metal Jigs to Minimize Hand Fitting. Automotive Industries, vol. 50, no. 24, June 12, 1924, pp. 1272–1273, 4 figs. Production methods similar to those used in chassis manufacture are employed in putting together wood frames and units from which they are constructed.

Brakes. Notes on Automobile Brakes, D. Roesch. Armour Engr., vol. 15, nos. 3 and 4, Mar. and Apr. 1924, pp. 91–94 and 112, and 135–139 and 151, 15 figs. Brake requirements, and performance obtainable with different systems; discusses representative types and gives data pertaining to brake design; highway capacity and influence of various conditions upon stopping distances, with a thought of legislative requirements.

Brakes, Four-Wheel. Advantages and Disadvantages of 4-Wheel Brakes (Licht- und Schattenseiten der Vierradbremsen), v. Löw. Automobil-Rundschau, vol. 23, no. 5, May 1924, pp. 51–53, 11 figs. Critical discussion of advantages and disadvantages.

British Empire Exhibition. Cars at the British Empire Exhibition. Autocar, vol. 52, no. 1489, May 2, 1924, pp. 785–792, 46 figs. Summarized specifications of models on view; 80 cars, ranging from 749 cc. to 7413 cc. cylinder capacity, represent 47 different manufacturers.

Chassis Lubrication. Chassis Lubrication. Soc. Automotive Engrs.—Jl., vol. 14, no. 6, June 1924, Contains following papers: Notes on Chassis Lubrication and Maintenance, A. F. Masury, pp. 641–646, 14 figs.; Magazine Oiling System of Chassis Lubrication, C. T. Myers, pp. 646–648, 5 figs.

Construction, Cast Iron in. Cast-Iron in Motor Car Construction, F. H. Hurren. Foundry Trade Jl., vol. 29, no. 405, May 22, 1924, pp. 423–426. Considers technical and metallurgical aspects of production of automobile parts, and extent to which science can assist.

Design. Racing's Effect on Design, W. F. Bradley. Autocar, vol. 52, no. 1491, May 16, 1924, pp. 865–866, 4 figs. Florio races (Sicily) indicate that famous continental constructors will offer production models with superchargers and dry sump lubrication as results of racing experience.

Indianapolis Race. Reliability is Outstanding Characteristic of Cars in This Year's Race, P. Dumas.

Manufactured by Advertisers — CLASSIFIED LIST OF MECHANICAL EQUIPMENT — Alphabetical List on page 150

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* Celite Products Co.
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** Catalogue data of firms marked * appear in the A.S.M.E. Condensed Catalogues of Mechanical Equipment, 1923-24 Volume*

Automotive Industries, vol. 50, no. 23, June 5, 1924, pp. 1213–1215, 6 figs. All but five of 22 entrants were running at finish of 1924 Indianapolis; average total time at pits is only 6.5 min. per car; Duesenberg supercharger proves worth.

Light. The German Light-Automobile Industry (Die deutsche Kleinauto-Industrie). Allgemeine Automobil-Zeitung, vol. 25, nos. 16 and 17, Apr. 19 and 26, 1924, pp. 17– 8 and 24–28, 45 figs. Details of different German makes in alphabetical order; tabular data on German light automobiles up to 6 hp.

Racing. Mercedes with Supercharger Engine Wins Sicilian Classic, W. F. Bradley. Automotive Industries, vol. 50, no. 21, May 22, 1924, pp. 1116–1118, 8 figs. Results of 335-mi. race; air filters and dry sump lubricating systems employed on some cars entered; those who use servo mechanisms find them advantageous; details in brief of Diat, Peugeot, Mercedes, and Hispano-Suiza cars.

Riley. The Eleven-Forty Riley. Auto-Motor Jl., vol. 29, no. 22, May 29, 1924, pp. 455–457, 9 figs. Light car of English manufacture; mechanical accuracy and efficiency have been brought to a high pitch; great comfort and roominess; engine is of monobloc construction with detachable head.

Rover. The 14 H. P. Rover. Auto-Motor Jl., vol. 29, no. 20, May 15, 1924, pp. 413–416, 11 figs. Monobloc engine with detachable head and side-camshaft-operated side-by-side valves; cylinders of 75 mm. bore and stroke 130; 40 b.hp. obtained.

The Rover "Nine." Auto-Motor Jl., vol. 29, no. 23, June 5, 1924, pp. 477–479, 10 figs. New model, with 4-cylindered over-head-valve water-cooled engine in 1100-cc. class; develops 20 hp. at 3000 r.p.m.

Steering-Gear Analysis. Steering-Gear Analyses, F. F. Chandler. Soc. Automotive Engrs.—Jl., vol. 14, no. 6, June 1924, pp. 585–590 and 648, 8 figs. Describes set of automatic recording instruments being developed by author assisted by H. A. Huebotter, that will record not only physical effort needed to steer automobile, but simultaneously, forces and shocks imposed upon entire steerin. system, so that such records will constitute basis for steering-system design; study of helix characteristics; possibilities of producing variable-ratio helix that gives great mechanical advantage in extreme positions.

Streamline. The Future High-Speed Automobile (Der künftige Schnellkraftwagen), A. Persu. Allgemeine Automobil-Zeitung, vol. 25, no. 18, May 3, 1924, pp. 25–26, 2 figs. Author states future high-speed car will be streamline type, in which all four wheels are built within streamline form, the two rear driving wheels will be less distance apart than front wheels, passenger seats will be in front and power plant in rear.

Sunbeam. Three-Litre Super-Sports Sunbeam. Autocar, vol. 52, no. 1489, May 2, 1924, pp. 782–784, 7 figs. Standardization of a new edition of 6-cylinder 16–50-hp. car for high speed touring; improvements to 20–60-hp. model.

Suspension. A Promising Spring Suspension System. Motor Transport (Lond.), vol. 38, no. 1006, June 9, 1924, pp. 703–704, 2 figs. Details of Farnsworth design. Improved riding qualities obtained by eliminating unsprung weight and providing independent springing for each wheel.

Two-Wheeled. A Revolutionary Proposal, P. Schilovsky. Autocar, vol. 52, no. 1490, May 9, 1924, pp. 833–835, 3 figs. Advantages and possibilites of gyroscopic two-wheeled car, and its main principles of design and operation. Details of an experimental model.

AVIATION

Aerial Transportation. Air Transport and Its Uses, G. H. Thomas. Inst. Transport—Jl., vol. 5, no. 6, Apr. 1924, pp. 245–256 and (discussion) 256–261, 3 figs. Shows that this form of transport is of vital interest to British trade and commerce.

B

BEAMS

Elastic Line, Determination of. Graphic Determination of the Elastic Line of an Elastically Supported, Statically Indeterminate Beam (Zeichnerische Ermittlung der elastischen Linie eines federnd gestützten, statisch unbestimmten Balkens), C. B. Biezeno. Zeit. für angewandte Mathematik u. Mechanik, vol. 4, no. 2, Apr. 1924, pp. 93–102, 4 figs. Simple iteration method for determining reaction of support of such beams.

BEARINGS

Automobile Axles. The Friction Losses in Journal and Roller Bearings in Automobile Axles (Die Reibungsverluste der Gleitlager und der Rollenlager bei Automobilachsen), G. Becker. Motorwagen, vol. 27, no. 12, Apr. 30, 1924, pp. 201–206, 10 figs. Report of Experimental Station for Automotive Vehicles of Tech. High School, Berlin-Charlottenburg.

Lubrication. Some Types and Applications of Babbitt, Ball and Roller Hanger Bearings, F. E. Gooding. Indus. Engr., vol. 82, no. 5, May 1924, pp. 229–231 and 257, 9 figs. Methods of lubricating bearing surfaces and reducing friction losses.

Oil Engines. White Metal Bearings for Oil Engines, F. J. Taylor. Gas & Oil Power, vol. 19, no. 225, June 5, 1924, pp. 155–156, 2 figs. Causes and prevention of engine-shaft failure.

Use and Maintenance. Possible Improvements in Bearing Service, G. A. Van Brunt. Indus. Engr., vol. 82, no. 6, June 1924, pp. 264–270 and 304, 11 figs. Manufacturers of sleeve, ball and roller bearings give their viewpoint on things to be considered in connection with use and maintenance of bearings.

BEARINGS, BALL

Automobiles and Motorcycles. Precision Ball Bearings (Erzeugnisse der Schweinfurter Präzisions-Kugellager-Werke Fichtel & Sachs A.-G.). Automobil-Rundschau, vol. 23, no. 5, May 1924, pp. 56–59, 11 figs. Types of precision ball bearings made by firm of Fichtel & Sachs Corp. for automobile and motorcycle construction.

Machine Tools, Application to. Application of Ball Bearings to Machine Tools. Machy. (N. Y.), vol. 30, no. 10, June 1924, pp. 776–781, 9 figs.; also Machy. (Lond.), vol. 24, no. 609, May 29, 1924, pp. 257–262, 9 figs. Method of applying ball bearings to lathes, grinding machines, drilling-machine spindles, and transmission shafts.

Tests. Tests on Bearings (Lagerversuche), G. Meyer-Jagenberg. Werkstattstechnik, vol. 18, nos. 7 and 8, Apr. 1 and 15, 1924, pp. 214–217, and 229–236, 23 figs. Apr. 1: Investigation of two kinds of ball bearings; influence of load, speed and lubrication on friction conditions; importance of felt packing of ball-bearing housings. Apr. 15: Investigations of same bearings as transmission bearings; comparison of test-bed and transmission results; comparison of journal and ball-bearing transmission.

BEARINGS, ROLLER

Tapered. Production and Application of Tapered Roller Bearings. Machy. (Lond.), vol. 24, nos. 604, 605 and 606, Apr. 24, May 1 and 8, 1924, pp. 108–111, 129–131 and 161–165, 21 figs. Timken bearing and its production by Brit. Timken Ltd., Birmingham, Eng.

BELTING

Installation and Care. Installation and Care of Belting, C. O. Streeter. Paper, vol. 34, no. 3, May 8, 1924, pp. 90–91, 11 figs. Points in the purchasing of leather belting; approved types of belt drives; aligning and care of belts to avoid injury.

BLAST-FURNACE GAS

Cleaning. The Cleaning of Blast Furnace Gas. G. M. Hohl. Iron Age, vol. 113, no. 22, May 29, 1924, pp. 1563–1564. Savings from clean gas; preliminary cleaning; heat saved by dry cleaned gas; flue dust as washer sludge. (Abstract.) Paper read before Am. Iron & Steel Inst.

Composition. Composition of Blast-Furnace Gas (Sur la composition des gaz de hauts fourneaux), J. Seigle. Académie des Sciences—Comptes Rendus, vol. 178, no. 17, Apr. 22, 1924, pp. 1426–1429, 2 figs. With aid of graphic presentation author discusses possible proportions of carbon dioxide and monoxide in gas at mouth of blast furnace, Gruner's ideal point, extreme values of volume of oxygen reduced per kg. of carbon, possible compositions of gas produced when dry air containing 20 per cent of oxygen, or air enriched in oxygen, or pure oxygen is used for blast, etc.

BLAST FURNACES

Design, Progress in. Progress in Blast Furnaces (Considérations sur les progrès réalisés dans les hauts-fourneaux), R. Jordan. Revue de Métallurgie, vol. 21, nos. 3 and 4, Mar. and Apr. 1924, pp. 127–142 and 223–232, 20 figs. Critical examination of problems and solutions relating to progress in blast-furnace design during last 20 years. Mar.; Charging apparatus. Apr.: Determination of cross section; details of construction.

Fuel Regulation. Uniform Coking Coal is Needed, W. Mathesius. Iron Trade Rev., vol. 74, no. 22, May 29, 1924, pp. 1422–1424, 3 figs. Regulation of blast-furnace fuel in accordance with principles of iron-ore trade; author urges analysis as basis of accounting for furnace fuel. (Abstract.) Paper presented before Am. Iron & Steel Inst.

Metallic Obstructions, Formation of. Formation of Metallic Obstructions in Blast Furnaces (Sur la formation des loups dans les fours à cuve), B. Bogitch. Académie des Sciences—Comptes Rendus, vol. 178, no. 14, Mar. 31, 1924, pp. 1177–1179. Formation of obstructions in blast furnaces in which matte is produced by melting oxides or silicates with calcium sulphate is invariably preceded by separation of melt into two layers, upper of high sulphur content and highly fusible, lower of small sulphur content and of higher melting point; latter sinks and, on cooling, forms obstruction; construction of furnace to avoid obstructions.

BOILER EXPLOSIONS

Locomotive Boilers. Low Water Causes Fatal Crown Sheet Explosion. Boiler Maker, vol. 24, no. 5, May 1924, pp. 136–138, 3 figs. Report of Bur. of Locomotive Inspection investigation of A. T. & S. F. Locomotive 1455 disaster which occurred on Feb. 13, 1924.

BOILER FEEDWATER

Treatment. Boiler Feedwater (Kesselspeisewasser), Wimmelmann. Bergbau, vol. 37, nos. 8, 9 and 10, Apr. 17, May 1 and 15, 1924, pp. 141–144, 173–176 and 205–208, 8 figs. Describes in detail the various methods to prevent or remove boiler scale, also a number of devices used for this purpose.

BOILER FURNACES

Air Preheaters. The Preheating of Combustion Air (Le Réchauffage de l'air de Combustion). Chaleur & Industrie, vol. 5, no. 46, Feb. 1924, pp. 66–70. Critical remarks, by E. Damour and M. Lafargue on article by M. Roszak, published in Nov. 1923 issue of same journal, and reply of Ch. Roszak.

The Preheating of Combustion Air (Le préchauffage de l'air de la combustion), Roszak. Société des Ingénieurs Civils—Mémoires et Compte Rendu des Travaux, vol. 76, no. 10–12, Oct.-Dec. 1923, pp. 1145–1170, 8 figs. Study of question as to whether preheating of air of combustion offers same advantage when applied to evaporators as to metallurgical furnaces; derivation of calorific equation and analytical relation between preheating of air and increase of combustion temperature; advantages and disadvantages of process.

Ground Firebrick for Repair Ground Firebrick for Furnace Repair, Jos. Harrington. Power, vol. 59, no. 25, June 17, 1924, pp. 976–978, 10 figs. Results from experience with special bond made principally from old firebrick for laying up new walls and of mortar for facing or patching; thick joints of this bond show saving of 35 per cent over thin cement joint construction.

Lignite. Improvements in the Construction of Lignite Furnaces (Neue Wege im Bau von Braunkohlen-Grossfeuerungen), Pradel. Feuerungstechnik, vol. 12, no. 15, May 1, 1924, pp. 121–126, 7 figs. Extension grates and furnaces; drying on grate; drying in shaft in self-feed furnace with trough grate; step-grate half-gas furnaces; extension drying shafts; arrangements for low-temperature-tar production.

Oil-Fired. Efficiency in Oil Burning Installations, F. A. Rothwell. Power Plant Eng., vol. 28, nos. 10 and 12, May 15 and June 15, 1924, pp. 526–528 and 639–641, 3 figs. May 15: Furnace design and location of burners. June 15: Selection of burners; method of supplying fuel to burners; necessary auxiliary equipment; operation of fuel-oil-burning furnace.

Operation. The Economical Operation of Boiler Furnaces, R. June. Power House, vol. 17, no. 9, May 5, 1924, pp. 21–22, 5 figs. Stresses fact that development of flat suspended arch has been an important factor in reducing maintenance costs.

BOILER PLANTS

Iron and Steel Industry. The Generation and Utilization of Steam in the Iron and Steel Industry, J. A. Hunter. Mech. Eng., vol. 46, no. 6, June 1924, pp. 325–328 and 342, 3 figs. Equipment employed in iron and steel industry for generating and using steam; quantities and cost of fuel, and cost of converting heat in fuel to steam; present-day tendencies toward design and size of equipment, and refinements in control; describes two of latest installations; probable savings which could be made if all of steam required in industry were made and consumed in most efficient apparatus now in use.

BOILER ROOMS

Efficiency in. Boiler-Room Practice, J. Bruce. Elec. Rev., vol. 94, nos. 2424 and 2425, May 9 and 16, 1924, pp. 736–738 and 809–811, 3 figs. Furnace efficiency, excess air, and critical point of combustion.

BOILERMAKING

Locomotive. Building the Longest Locomotive Boilers in the World. Boiler Maker, vol. 24, no. 5, May 1924, pp. 127–133, 13 figs. Details of construction of boilers recently built by Am. Locomotive Co. for an order of 25 simple 2–8–8–2 Mallet locomotives for Chesapeake & Ohio R. R.; overall length of boiler 56 ft. 11 1/8 in.; 205 lb. steam pressure.

BOILERS

Benson High-Pressure. See STEAM GENERATORS, Benson High-Pressure.

Circulation. The Circulation Boiler (Der umlaufende Dampfkessel), Wintermeyer. Feuerungstechnik, vol. 12, nos. 15 and 16, May 1 and 15, 1924, pp. 127–128 and 137–138, 6 figs. High-pressure boilers; development of design of first Atmos boiler; present aims in design of circulation boilers.

Combustion Control. Combustion Control for Boilers, R. J. S. Piggott. Combustion, vol. 10, no. 6, June 1924, pp. 432–436. General discussion of subject; what combustion control should do, what it usually does, what it can do. Paper read before A.S.M.E.

Combustion Problems Calculation. The Relation of Ash Pit Loss to Flue Gas Analysis, R. Brown. Combustion, vol. 10, no. 6, June 1924, pp. 436–438, 2 figs. Two charts which furnish short-cuts in boiler calculations.

Fireproof Structures, Influence of. Influence of Fireproof Structures in Boilers (Die Wirkung von Einbauten in Flammrohrkesseln), Unger. Archiv für Wärmewirtschaft, vol. 5, no. 4, Apr. 1924, pp. 61–69, 17 figs. Propeller-shaped structures of fireproof material are inserted in fire tubes and give flue gases a spiral-shaped movement that improves combustion as well as heat transmission. Economy of old and new plants is greatly improved by simple and inexpensive means.

Locomotive. See LOCOMOTIVE BOILERS.

Priming of. Priming of Boilers, A. A. Pollitt-Gas Engr., vol. 40, no. 576, Apr. 1924, pp. 74–76, 1 fig. Discusses problem of priming and necessity for maintaining low concentrations in feedwater.

Scale Removal. Boiler Tubes and Boiler Scale. Eng. & Boiler House Rev., vol. 37, no. 10, May 1924, pp. 370 and 372–373, 3 figs. Some of the most modern methods of scale removal.

Tests. Evaporation Tests (Les essais de vaporisation), V. Kammerer. Société Industrielle de Mulhouse—Bul., vol. 90, no. 1, Jan. 1924, pp. 27–56. Classification of tests into scientific, performance, industrial and comparative tests; duration and conducting of tests; determination of efficiency and heating value; distribution of losses; heat balance; presentation of results. Author points out difficulties in formulating concise rules for conducting evaporation tests and presenting results.

Water-Tube. See BOILERS, WATER-TUBE.

BOILERS, WATER-TUBE

Water Circulation. Studies of Water Circulation in Vertical-Tube Boilers (Studien über Wasserumlauf in Steilrohrkesseln), Schirmer. Wärme, vol. 47, no. 8, Feb. 22, 1924, pp. 73–76, 12 figs. Observations made on two model boilers from heating until first production of steam, with uniform and varying steam generation; conclusions from results obtained.

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Alphabetical List on page 150

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Engines, Pumping
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* Morris Machine Works
* Nordberg Mfg. Co.
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Engines, Steam
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* Nordberg Mfg. Co.
* Vilter Mfg. Co.

*Catalogue data of firms marked * appear in the A.S.M.E. Condensed Catalogues of Mechanical Equipment, 1923-24 Volume*

BOMBING

Aerial. Aerial Bombing, A. H. Hobley and H. B. Inglis. Mech. Eng., vol. 46, no. 6, June 1924, pp. 309–316, 8 figs. Early practice and conditions; bombing moving targets; theory of bomb trajectory; principles of various sights; ground-speed determination; sources of error and methods of overcoming them.

BUSES

Trolley. The Trolley-Bus Line between Modane and Lanslebourg (France) (La ligne d'electrobus de Modane à Lanslebourg), A. Chardin. Industrie des Tramways, vol. 18, no. 206, Feb. 1924, pp. 41–46, 4 figs. Brief description of installations, including two substations, trolley lines, passenger buses and trucks; results of tests and economic advantages of system.

BUSHINGS

Cast-Iron. Close Work on a Cast Iron Bushing, D. T. Hamilton. Am. Mach., vol. 60, no. 25, June 19, 1924, pp. 915–917, 5 figs. Accurate guide bushing for gear-shaper spindle; tolerance of 0.0002 in. in bore; unsuccessful methods; grinding operations.

C

CALCULATING MACHINES

Cost Accounting. The Mechanical Compilation of Costs. Eng. Production, vol. 7, no. 140, May 1924, pp. 139–141, 5 figs. Describes machines in connection with Powers system, and their performance; system where one clerical entry is required to produce a master from which all subsequent work may be done by mechanical means.

CAR COUPLERS

Automatic. Von Scharfenberg Automatic Railroad Coupling (Die selbsttätige Eisenbahnkupplung von Scharfenberg), P. Paap. Praktische Maschinen-Konstrukteur, vol. 57, no. 10, Mar. 25, 1924, pp. 128–131, 7 figs. Description of this coupling, and its great advantages over earlier designs; is always in proper position for automatic connection; air brake hose is also automatically connected; ring springs act as draft gears.

CAR WHEELS

Manufacture. The Manufacture of Railway Tires. Engineer, vol. 137, no. 3570, May 30, 1924, pp. 602–603. Account of work done in Sheffield, England, 50 years ago.

Metal Roofs, Reclamation of. Central of Georgia Reclaims Metal Car Roofs, W. H. Harrison. Ry. Mech. Engr., vol. 98, no. 6, June 1924, pp. 329–332, 11 figs. 60 per cent of all sheets removed are restored to service at cost of $10 per car.

Painting, Mechanical. The Possibilities of Mechanical Painting, J. W. Gibbons. Ry. Mech. Engr., vol. 98, no. 6, June 1924, pp. 360–362, 5 figs. Handicaps which have been overcome; protection of equipment increased against corrosion or decay.

Shops. Improvements in the Johnstown Car Shops, Geo. A. Richardson. Ry. Rev., vol. 74, no. 23, June 7, 1924, pp. 1040–1045, 10 figs. Improvements and additions made by Bethlehem Steel Co. to what were formerly known as Cambria car shops.

CARS, FREIGHT

Foundation Brake Gear. Freight Car Foundation Brake Design, W. G. Stenason. Ry. Rev., vol. 74, no. 21, May 24, 1924, pp. 923–924, 5 figs. Describes form of foundation brake gear, with slack compensating attachment, that has given very satisfactory service. (Abstract.) Paper presented before Air Brake Assn.

Rebuilding Contest. Box Cars Rebuilt in Record Time, D. & H. Co. Ry. Rev., vol. 74, no. 21, May 24, 1924, pp. 913–921, 12 figs. At freight-car rebuilding contest conducted at Oneonta, N. Y., entire superstructure of 60,000-lb. capacity, steel underframe, double-sheathed box car was rebuilt in record time of 52 man-hours.

CARS, PASSENGER

Oriental Limited. New Equipment for Oriental Limited Trains. Ry. Age, vol. 76, no. 26, May 31, 1924, pp. 1303–1305, 8 figs. Great Northern cars of improved design to be placed in service between Chicago, Seattle and Portland; equipment of each train will consist of dynamo baggage car, smoking car, first-class coach, Pullman tourist car, dining car, pullman sleepers and observation car.

Steel. The Passenger Car Up-to-Date, C. E. Barba. New Eng. Railroad Club, Apr. 8, 1924, pp. 70–81 and (discussion) 81–103. Discussion of construction of steel passenger cars. Ideals to be considered in up-to-date equipment. Tentative specification for painting.

CASE-HARDENING

Prevention by Copper Plating. Prevention of Case-Hardening by Copper Plating, J. C. McCullough and O. M. Reiff. Indus. & Eng. Chem., vol. 16, no. 6, June 1924, pp. 611–613, 4 figs. Selective case-hardening by carbon-pack method may be secured by protecting desired parts with copper plating; method can always be relied upon when copper plating is perfect.

CAST IRON

Chemical Composition, Influence of. Influence of Chemical Composition on Cast Iron. Metal Industry (Lond.), vol. 24, nos. 14, 15, 16, 17, 18 and 19, Apr. 4, 11, 18, 25, May 2 and 9, 1924, pp. 331–333, 355–356, 379–380, 403–405, 431–432 and 455–457, 3 figs. Influence of silicon, sulphur, phosphorus, and manganese; carbon forms and changes under the various conditions of chemical composition and temperature influences.

Cooling Effects in. Some Cooling Effects in Cast Iron and Their Correction, R. T. Rolfe. Metal Industry (Lond.), vol. 24, nos. 21, 22 and 23, May 23, 30 and June 6, 1924, pp. 501–502, 525–526 and 551–552, 2 figs. General causes giving rise to internal stresses in castings and methods of relieving them. Particulars of a series of tests carried out into annealing temperatures. Typical cases in which annealing is resorted to.

Graphitic Softening. The Graphitic Softening of Cast Iron, J. W. Shipley and I. R. McHaffie. Indus. & Eng. Chem., vol. 16, no. 6, June 1924, pp. 573–575, 6 figs. Graphitic softening is produced by retention within residual structure of cementite-phosphide eutectic and graphite of some of products of corrosion; wrought iron, steel, and some cast irons corrode out of face and hole, owing to absence of supporting noncorrodible framework.

Non-Magnetic. Non-Magnetic Cast Iron, S. E. Dawson. Foundry Trade Jl., vol. 29, no. 406, May 29, 1924, pp. 439–444, 10 figs. Effect and distribution of constituents; phosphide eutectic; position-of-eutectic experiments; disposition of silicide of iron.

Pearlitic. Pearlitic Cast Iron, K. Emmel. Mech. Eng., vol. 46, no. 6, June 1924, pp. 352–353. Methods of production; photomicrographs and structure of piston rings cast in pearlitic metal. Translated and abstracted from Stahl u. Eisen, vol. 44, no. 13, Mar. 27, 1924.

Pearlitic Cast Iron. Metal Industry (Lond.), vol. 24, no. 20, May 16, 1924, pp. 477–478. Comments on recent work, including process of Diefenthaler and Sipp, iron-carbon conditions, mechanism of change on slow-cooling, etc.

The Manufacture of Pearlitic Cast Iron for High-Temperature Engines, A. Marks. Foundry Trade Jl., vol. 29, no. 404, May 15, 1924, pp. 406–408, 3 figs. Author's attempts to produce pearlitic cast iron in cupola with a view to obtaining strongest material possible for manufacture of castings for parts subjected to high temperature, such as internal-combustion-engine cylinder covers and pistions.

CENTRAL STATIONS

Abandoned, Idle-Equipment Utilization. Utilization of Abandoned Steam Power Plants, H. A. Woodworth. Nat. Engr., vol. 28, no. 6, June 1924, pp. 262–264, 3 figs. Constructive suggestion for making use of idle equipment at present located in the many abandoned power plants throughout the country.

Private Plant, vs. Central-Station Power Versus the Private Plant, H. C. Thuerk. Elec. World, vol. 83, no. 22, May 31, 1924, pp. 1140–1141. Disadvantages of isolated plant which are sometimes overlooked in comparing relative merits of two sources of power.

Service Improvement. Improving Central Station Service by the Application of Current-limiting Reactors to Distribution Feeders, D. K. Blake. Gen. Elec. Rev., vol. 27, no. 6, June 1924, pp. 361–368, 17 figs. Decided advantages that are obtainable by installation of current-limiting reactors in distribution feeders.

Unit Costs. Power Plant Unit Costs and Their Engineering Significance, L. Helander. Elec. Jl., vol. 21, no. 6, June 1924, pp. 285–290, 4 figs. Presents unit costs intended to be a guide to engineer undertaking a preliminary survey of desirability of expanding capacity of an existing power station, of building a new sation, or of entering into an agreement with an existing power plant for purchase of power, and particularly to assist engineers who are not continuously engaged in power-plant erection but find it necessary to make occasional surveys of power-generating costs.

CHARTS

Construction and Functions. The Construction of the Principal Types of Charts Employed in Industry (Note sur la construction des principaux types d'abaques employés dans l'industrie), P. Cayère. Arts & Métiers, vol. 77, no. 41, Feb. 1924, pp. 45–62, 24 figs. Discusses different types of charts and explains their various functions.

Instructional Purposes. The Diagram and Its Use for Instruction Purposes in Continuation Schools (Das Diagramm und seine Verwendung als Anschauungsmittel im Unterricht der Fortbildungsschule), L. Werner. Werkstattstechnik, vol. 18, nos. 7 and 8, Apr. 1 and 15, 1924, pp. 209–214 and 237–244, 27 figs. Most important kinds and forms of diagrams, with special regard to enlightening public with regard to industrial facts and conditions; importance of diagram as subjective and objective medium of instruction.

Production Reports. Charts for Report Purposes, H. N. Stronck. Mgt. & Administration, vol. 7, no. 6, June 1924, pp. 705–709, 6 figs. Treatment of large production charts; reproductions of charts; photostat reproduction of special material; lettering of charts; chart showing percentage fluctuations; arrangement of charts in report.

CLUTCHES

Drums, Deformation of. Investigations of Deformation in Clutch Drums (Formänderungs-Untersuchungen an Kupplungstrommeln), G. Peneff. Maschinenbau, vol. 3, no. 15, May 8, 1924, pp. 517–520, 10 figs. Deformation tests on four different types of gear clutch drums of benzol rail car; gives figures and diagrams which are of value in design and calculation of clutch drums.

Ring. Expanding and Contracting Ring Clutches, A. Clegg. Machy. (N. Y.), vol. 30, no. 10, June 1924, pp. 793–796, 6 figs. Expanding ring clutch with unusual adjustment; design operated by toggle levers; Johnson expanding ring clutch; contracting type of ring clutch.

COAL

Carbonization. Practical Coal Carbonization, F. W. Sperr, Jr. Mech. Eng., vol. 46, no. 6, June 1924, pp. 329–333, 4 figs. Discusses high-temperature and low-temperature carbonization with special reference to American conditions.

Cleaning and Sizing. How to Clean and Size Coal so That a Favorable Market Can be Maintained. Coal Age, vol. 25, no. 21, May 22, 1924, pp. 761–764, 10 figs. By air cleaning, ash is reduced between 33 to 50 per cent; coal gets to market unfrozen; what coal should be sized in tipple and what in rescreen. Discussion at meeting on coal preparation at Am. Min. Congress. See also article by G. F. Osler entitled, How Should Coal be Screened and into How Many Sizes, pp. 762–764.

COAL HANDLING

Piers. Modern Practice of Handling Coal in Bulk at Coal Piers, J. W. Speer. Elec. Jl., vol. 21, no. 6, June 1924, pp. 260–265, 11 figs. Turning-type dumper installation, direct-loading stationary lifting-type dumper, direct-loading stationary revolving-type dumper, mechanical coal trimmers, etc.

COKE

Blast-Furnace. Production of High-grade Blast-furnace Coke, H. M. Chance. Am. Inst. Min. & Met. Engrs.—Trans., no. 1351-C, June 1924, 8 pp., 2 figs. Outline of differential separation which makes available vast stores of low-ash coal locked up in coal beds from which it has been impossible to ship anything better than fair grades of steam coal; can be made by any liquid or solution having specific gravity greater than that of coal which is to be floated and less than that of coal that is to be separated by sinking in liquid.

Properties. The Quality of Coke, Determination of its Properties and the Development of Good Grades (Koksbeschaffenheit, Bestimmung der Eigenschaften und Erzielung guter Sorten), E. Diepschlag. Stahl u. Eisen, vol. 44, no. 18, May 1, 1924, pp. 496–498. Combustibility and strength of coke; coking process; author recommends coking under pressure.

CONDENSERS, STEAM

Barometric, Testing. Testing Steam Turbine and Barometric Condenser, F. S. Youtsey. Power, vol. 59, no. 25, June 17, 1924, pp. 979–980, 2 figs. Method employed in testing condenser serving mixed-pressure steam turbo-generator.

Pumps, Cooling-Water. Economical Operation of Condenser Pumps, Chas. E. Colborn. Power Plant Eng., vol. 28, no. 12, June 15, 1924, pp. 643–645, 4 figs. Study of conditions governing use of one or two circulating pumps with changes in cooling-water temperatures.

CONDUITS

Penstock Manifolds. Penstock Manifolds Designed to Simplify Stresses, H. L. Doolittle and C. W. Larner. Eng. News-Rec., vol. 92, no. 24, June 12, 1924, pp. 1006–1008, 7 figs. Describes unusual penstock manifolds of radically different types installed at two of new power plants, one at Big Creek, no. 3 plant of S. Cal. Edison Co., and other in Vermont at Davis Bridge plant of N. E. Power Co.; both manifolds designed to eliminate as many indeterminate stresses as possible.

CONVEYORS

Forgings and Scrap Handling. Conveyors to Handle Forgings and Scrap. Iron Age, vol. 113, no. 24, June 12, 1924, pp. 1711–1712, 3 figs. Application of conveyor equipment for handling flashings and small automobile forgings from cold trimming presses at forge plant of Chevrolet Motor Co., Detroit.

CORROSION

Electrolytic. Electrolytic Corrosion in a Water-Gas Holder, F. H. Rhodes and E. B. Johnson. Indus. & Eng. Chem., vol. 16, no. 6, June 1924, p. 575. Describes special case of electrolytic corrosion and gives results of investigation.

Study of. A Paradox in Corrosion, U. R. Evans. Chem. & Met. Eng., vol. 30, no. 24, June 16, 1924, pp. 949–953, 3 figs. Mechanism by which currents are produced explains why corrosion depending on oxygen is sometimes greatest where oxygen is excluded.

COST ACCOUNTING

Capital Control. Capital Requirements and Control, J. H. Bliss. Mgt. & Administration, vol. 7, no. 6, June 1924, pp. 653–658. Discusses protection of working capital.

Depreciation Schedules. New Forms of Depreciation Schedules, G. W. Greenwood. Mgt. & Administration, vol. 7, no. 6, June 1924, pp. 689–692, 3 figs. Outlines method called sinking-fund method, which is believed to be new and to have advantages in many cases; comparison of sinking-fund method with straight-line method.

COTTON MILLS

Mechanical Engineering and Management. The Relation of Mechanical Engineering to Management in the Textile Industry, E. H. McKitterick. Mech. Eng., vol. 46, no. 6, June 1924, pp. 343–344 and 359. Reduction of cost of manufacture by means of improvements in power, lighting, and heating systems, and in handling of goods between processes.

CRANES

Quay. The Design of Quay Cranes, F. M. Du Plat Taylor. Engineer, vol. 137, no. 3570, May 30, 1924, p. 598, 2 figs. Suggests arrangement and design of cranes to meet requirements of modern large sea-going vessels.

Self-Propelling. A French Automobile Crane. Engineer, vol. 137, no. 3570, May 30, 1924, pp. 604–605, 2 figs. Type of self-propelled crane extensively used in France for railway siding and port work, as well as for town and city transport and cleaning services.

Manufactured by Advertisers — CLASSIFIED LIST OF MECHANICAL EQUIPMENT — Alphabetical List on page 150

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(See Clutches, Hoists, etc., Friction)

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Gates, Cut-off
Easton Car & Construction Co.
Link-Belt Co.

Gates, Sluice
* Chapman Valve Mfg. Co.
* Pittsburgh Valve, Fdry. & Cons. Co.

Gear Blanks
Cann & Saul Steel Co.

Gear Cutting Machines
* Jones, W. A. Fdry. & Mach. Co.

Gear Hobbing Machines
* Jones, W. A. Fdry. & Mach. Co.

*Catalogue data of firms marked * appear in the A.S.M.E. Condensed Catalogues of Mechanical Equipment, 1923-24 Volume*

D

DIES

Forging. Taking the Guesswork Out of Dies, C. C. Rhead. Forging—Stamping—Heat Treating, vol. 10, no. 3, May 1924, pp. 188–193, 3 figs. Records covering die performance essential to efficient production; discusses system for recording performance of dies used in production of pressed-metal parts.

Progressive. Progressive Dies for Piercing, Bending, and Blanking, W. Richards. Machy. (Lond.), vol. 24, no. 606, May 8, 1924, pp. 174–175, 5 figs. Comments on progressive die for production of bracket, described in same journal (vol. 23, p. 543), and shows that simpler tool and simpler method of producing piece, in one operation, are both available.

Sewing-Machine Parts. Dies for Producing a Complicated Sewing-machine Part, C. E. Stevens. Machy. (N. Y.), vol. 30, no. 10, June 1924, pp. 783–786, 6 figs. Piercing and blanking die; die for second and for final forming operation.

DIESEL ENGINES

Double-Acting. Double-Acting Marine Diesel Engines. Engineering, vol. 117, no. 3048, May 30, 1924, pp. 707–708, 7 figs. on supp. plates. Details of 1000-i.hp. experimental 4-cycle North-Eastern-Werkspoor engine. See also Engineer, vol. 137, nos. 3570 and 3571, May 30 and June 6, 1924, pp. 604 and 626–627, 5 figs. partly on p. 630.

Manufacture. One of America's Prominent Diesel Plants. Motorship, vol. 9, no. 6, June 1924, pp. 434–436 and 441, 6 figs. Describes Cleveland, Ohio, plant of Winton Engine Works. Quantity production, handling and routing highly developed.

Non-Reversible. Reversible and Non-Reversible Marine Diesel Engines (Umsteuerbare und nicht umsteuerbare Schiffsdieselmaschinen), M. W. Gerhards. Zeit. des Vereines deutscher Ingenieure, vol. 68, no. 22, May 31, 1924, pp. 579–580. Critical discussion of advantages of non reversible engines with reversible intermediate gears over directly reversible engines.

Sun-Doxford. Sun-Doxford Engines of the Henry Ford II. Mar. Eng., vol. 29, no. 6, June 1924, pp. 334–337, 5 figs. First application of large Diesel engines on a Great Lakes bulk freighter. Details of engines; opposed-piston type, having four cylinders 23½ in. in diameter, each piston having stroke of 45½ in.; approximate shaft horsepower 3000 at 85 r.p.m.

Tosi. The Tosi Diesel Engine, G. C. Ziliotto. Mar. Eng., vol. 29, no. 6, June 1924, pp. 357–360, 6 figs. Discusses features of Tosi engines principally combined inlet and exhaust valves, injection valve, and method of cooling cylinder.

Warships. Further Experimental Work on Diesel Engines, R. Beeman. Engineering, vol. 117, nos. 3043, 3044 and 3045, Apr. 24, May 2 and 9, 1924, pp. 559, 589–591 and 624–625, 22 figs. Discusses possibilities of application of Diesel engines for propelling machinery of surface war vessels. (Abstract.) Paper read before Instn. Nav. Architects. See also Engineer, vol. 137, nos. 3566, 3567, 3568 and 3569, May 2, 9, 16 and 23, 1924, pp. 487–488, 517–518, 547–548 and 578–579, 22 figs.

DRILLING MACHINES

Angular Settings for. Angular Settings for Drilling and Boring. Mech. Wld., vol. 75, nos. 1943, 1945 and 1948, Mar. 28, Apr. 11 and May 2, 1924, pp. 190–192, 222 and 270–271, 16 figs. Describes various methods of angular setting.

Radial. A New Portable Universal Radial Drilling Machine. Eng. Production, vol. 7, no. 140, May 1924, pp. 144–145, 4 figs. Describes drilling and tapping machine of Wm. Asquith, Ltd., Halifax.

DURALUMIN

Properties and Uses. Duralumin (Duralumin), R. Beck. Zeit. für Metallkunde, vol. 16, no. 4, Apr. 1924, pp. 122–127, 2 figs. Its properties and uses; refining process.

DUST

Removal of. Dust Removal and Gas Purification by Means of Electricity (Entstaubung und Gasreinigung durch Elektrizität), E. Zopf. Montanistische Rundschau, vol. 16, no. 6, Mar. 16, 1924, pp. 135–138, 3 figs. Description of Cottrell-Möller electric process, according to which gases are conducted through a high-tension electric field, carrying pulsative direct current of about 50,000 volts. Metal dust, vapor and smoke-containing gases are completely purified by this process. Hundreds of successful installations in Germany.

DYEING

Turkey Red. Comparison of Methods for Dyeing Turkey Red (Contribution à l'étude du rouge Alizarine teint), Chas. Sunder. Société Indutrielle de Mulhouse—Bul., vol. 90, no. 1, Jan. 1924, pp. 72–79. Review of methods in which fabric is mordanted, before dyeing, with oil and alumina or with alumina and then oil, or is mordanted after dyeing (padding) with Alizarin.

DYNAMOMETERS

Direct-Reading Power Indicator. A Direct-Reading Power Indicator (Indicateur de puissance à lecture directe), H. Guillou. Société d'Encouragement pour l'Industrie Nationale—Bul., vol. 135, no. 10, Dec. 1923, pp. 1163–1170, 7 figs. Apparatus developed by author which, in contrast to simple dynamometer, registers actual power transmission at any moment; can be applied in all cases where power is transmitted by means of rotating shaft.

Hub. Dynamometer Hub for 200-M-Kg. Torsional Moment and 1200-Kg. Tension (Die Messnabe für 200 mkg Drehmoment und 1200 kg Zug, Bauart Stieber), W. Stieber. Zeit. für Flugtechnik u. Motorluftschiffahrt, vol. 15, no. 7–8, Apr. 26, 1924, pp. 69–73, 18 figs. Describes development of dynamometer hub, of Stieber design, suitable for Liberty-12 engine; results of tests.

E

ECONOMIZERS

Operation. The Efficient Operation of the Economiser. Eng. & Boiler House Rev., vol. 37, no. 11, June 1924, pp. 425–427, 3 figs. Discusses methods whereby maximum efficiency may be obtained, both as regards reduction in coal bill and satisfactory operation of installation, especially from point of view of length of service.

EDUCATION, ENGINEERING

Calculus, Value of. Value of Calculus to the Engineer, R. Fleming. Can. Engr., vol. 46, no. 23, June 3, 1924, pp. 587–588. Divergent views as to value of calculus. Personality of instructor of more importance than text-book; better to learn calculus at college than after.

ELECTRIC DRIVE

Shipyards. Electrical Power Transmission for Shipyards, T. Schwarz. Eng. Progress, vol. 5, no. 5, May 1924, pp. 85–88, 7 figs. Show how all kinds of power transmission, especially hydraulic transmission, have been substituted by electrical drives, which has recently even mastered largest machines for handling plates.

ELECTRIC FURNACES

Brass. Present Tendencies in Electric Brass-Furnace Practice, H. W. Gillett and E. L. Mack. U. S. Bur. Mines, Reports of Investigations, No. 2597, Apr. 1924, 10 pp. Also Brass Wld., vol. 20, no. 5, May 1924, pp. 163–166. Trend of developments in practice in last two years. Bibliography.

Electrode-Regulating Motors. Electrode Regulating Motors of Electric Steel Furnaces (Die Elektrodenreguliermotoren der Elektrostahlöfen), K. Kerpely. Giesserei-Zeitung, vol. 21, no. 8, Apr. 15, 1924, pp. 153–157. Principle and design of d. c. regulating motors; calculation of speeds; method of three-phase regulation; induction motor; speed regulation and braking.

Heat-Treating Razor Blades. Electric Furnaces for the Heat Treatment of Razor Blades. Engineering, vol. 117, no. 3048, May 30, 1924, pp. 713–714, 4 figs. Wild-Barfield electric hardening and tempering furnaces, installed at works of Wilkinson Sword Co. for heat treatment of hollow-ground blades for safety razors.

Heating in Vacuum. Apparatus for Heating Electrically in a Vacuum to a High Temperature (Sur un dispositif permettant de chauffer électriquement dans le vide à haute température), P. Lebeau and M. Picon. Académie des Sciences—Comptes Rendus, vol. 178, no. 14, Mar. 31, 1924, pp. 1151–1153. Apparatus consists essentially of tube of carbon, molybdenum, or tungsten, which forms resistance and which is placed in flask of Pyrex glass or quartz; authors describe use and calibration of optical pyrometer of double-scale, disappearing-filament type which was used in connection with apparatus.

Pig-Iron. New Norwegian Electric Pig Iron Furnace, F. Hodson and M. Sem. Iron Age, vol. 113, no. 22, May 29, 1924, p. 1585, 1 fig. Open-top furnace successfully operating with charcoal or coke; new ore-reduction process.

Principles and Design. Electric Furnaces (Les Fours électriques). Electricien, vol. 55, nos. 1347 and 1348, May 1 and 15, 1924, pp. 193–197 and 221–225, 15 figs. General considerations; electrothermal problem; resistance furnaces; arc and induction furnaces.

Steel. Progress in the Production of Electric Steel (Die Fortschritte der Elektrostahlerzeugung), F. Sommer. Stahl u. Eisen, vol. 44, nos. 18, 19 and 20, May 1, 8 and 15, 1924, pp. 490–496, 526–530 and 553–558 and (discussion) 558–560. Statistical data; arc and induction furnace; economical and metallurgical features.

ELECTRIC LOCOMOTIVES

Norfolk & West. Ry. New Electric Locomotives of the N. & W. Ry., T. C. Wurts. Ry. Rev., vol. 74, no. 23, June 7, 1924, pp. 1018–1022, 9 figs. Equipment just put in service illustrates advances of 30 years' experience in electric motive power.

Switching. Electric Switchers for Paulista Railway, W. D. Bearce. Elec. Traction, vol. 20, no. 5, May 1924, pp. 214–215, 2 figs. Steeple cab-type electric switching locomotives used on railway in Brazil; running gear consists of two swivel trucks each equipped with two GE-255—1500/3000 volt motors.

2-8-2. The Pennsylvania 2-8-2 Type Electric Locomotive, W. H. Eunson. Ry. & Locomotive Eng., vol. 37, no. 6, June 1924, pp. 173–175, 3 figs. Details of L-5 locomotives for passenger and freight service.

ELECTRIC RAILWAYS

Traction Exhibit, Erie, Pa. Electric Traction Exhibit Held at Erie, Pa. Ry. Age, vol. 67, no. 25, May 24, 1924, pp. 1267–1269, 5 figs. Demonstration includes 3000-volt d.c. multiple-unit train for suburban service; current-collection tests; otheograph for recording action on rails of each separate wheel of locomotive or motor car; locomotive tests.

ELECTRIC WELDING

Oil Tanks. Electric Welding of Large Storage Tanks, H. C. Price. Am. Inst. Min. & Met. Engrs.—Trans., no. 1345-P, June 1924, 11 pp., 12 figs. Describes construction of welded roofs and bottoms and gives their advantages over riveted construction; data and conclusions obtained from observations made during welding of tanks by Welding Eng. Co., Texas City, Tex., and Tonkawa and Burbank, Okla.

ELECTRIC WELDING, ARC

Alternating-Current. Electric Welding with A. C. Arc (Die elektrische Schweissung mit dem Wechselstrom-Lichtbogen), F. Wörtmann. Elektrischer Betrieb, vol. 22, no. 9, May 10, 1924, pp. 73–77, 12 figs. Investigations carried out in laboratory for electric plants and railways of Technical High School of Hannover.

Rail Joints. Improvements in Arc-Welded Rail Joints, R. B. Fehr. Elec. Ry. Jl., vol. 63, no. 20, May 17, 1924, pp. 783–785. Recent developments in method of welding joint plates by means of carbon arc process, and tests on several types of joints.

ELEVATORS

Gearless Traction Motor and Brake. Mechanical Features of the Gearless Traction Elevator Motor and Brake, J. J. Matson. Gen. Elec. Rev., vol. 27, no. 6, June 1924, pp. 390–394, 7 figs. Shows how manufacturer's engineers have made a thorough study of each part and have developed a most capable elevator hoist.

ENGINEERING

Mechanical, in Military Service. The Progress of Mechanical Engineering in the Military Service, G. LeQ. Martel. Instn. Mech. Engrs.—Proc., no. 2, Jan. 1924, pp. 101–138, 9 figs. Brief historical survey of work of mechanical engineer in army up to outbreak of Great War; how work of mechanical engineer was organized and carried out during war and progress made since war; account of work in connection with repair of munitions of war of every kind in field.

ENGINEERS

Training. The Training of Works Students (Praktikantenausbildung), J. Hanner. Zeit. des Vereines deutscher Ingenieure, vol. 68, no. 22, May 31, 1924, pp. 569–573. Length of training course; training in and outside of shop.

EVAPORATION

Heat of. The Heat of Vaporization and the Pressure of Saturated Vapor at Very Low Temperatures (Ueber die Verdampfungswärme und den Druck gesättigter Dämpfe bei sehr niedrigen Temperaturen), A. Brandt. Annalen der Physik, vol. 73, no. 5–6, Feb. 1924, pp. 406–408, 3 figs. Discussion of theorem of Nernst, Clapeyron's equation, and deduction thereof by E. Ariès.

F

FIRE EXTINGUISHERS

Foam. Testing of Foam for Use on Fires, C. K. Swift. Indus. & Eng. Chem., vol. 16, no. 6, June 1924, pp. 580–582, 1 fig. Describes desirable characteristics of foams and foam solutions; analytical methods applicable to solutions, and methods for comparing fire resistance and other physical characteristics of foams.

FLIGHT

Motorless. Scientific Principles and Prospects of Motorless Flight (Wissenschaftliche Grundlagen und Aussichten des Motorlosen Fluges), A. Pröll. Zeit. des Vereines deutscher Ingenieure, vol. 68, no. 22, May 31, 1924, pp. 557–561, 6 figs. General mechanical principles of gliding flight and of static and dynamic soaring flight; constructive peculiarities and performances of soaring planes; applications of soaring flight for scientific and traffic purposes.

FLOW OF FLUIDS

Pipes. The Pressure Drop in Smooth Pipes and the Coefficient of Flow of Standard Nozzles (Der Druckabfall in glatten Rohren und die Durchflussziffer von Normaldüsen), M. Jakob and S. Erk. Zeit. des Vereines deutscher Ingenieure, vol. 68, no. 22, May 31, 1924, pp. 581–584, 7 figs. Law of pressure drop of a flowing liquid in smooth pipe is tested within range of Reynolds values with water and air.

FLOW OF WATER

Channels. Calculation of the Flow of Water in a Channel (Bijdrage tot de berekening van den afvoer van zijdelingsche overlaten), O. J. Herz. Waterstaats-Ingenieur, vol. 12, no. 3, Mar. 1924, pp. 59–67, 3 figs. Theory and formulas for calculation of flow of water in a channel from changes of level produced by introduction of a barrier.

FLUE-GAS ANALYSIS

CO Meters. Electrical Carbonic Oxide and Hydrogen Meters, E. Zopf. Eng. Progress, vol. 5, no. 5, May 1924, pp. 91–92, 6 figs. Electric apparatus for testing flue gases for their content of combustible components (especially carbonic oxide and hydrogen).

CO_2 Recorders. A New Measuring Instrument for the Registration of CO_2 and CO Based on Physical Principles (Ein neues Messgerät zur Registrierung von CO_2 und CO auf physikalischer Grundlage), R. Dunckel. Gas- u. Wasserfach, vol. 67, no. 15, Apr. 12, 1924, pp. 197–199, 3 figs. New double recorder for determination of CO together with CO_2 in flue gases.

The "Positif" CO_2 Recorder (Analyseur de CO_2 "positif"). Chaleur & Industrie, vol. 5, no. 48, Apr. 1924, pp. 195–197, 5 figs. Describes new and simple apparatus manufactured by Société Annoyme des Appareils de Manutention & Fours Stein, Paris.

Manufactured by Advertisers — CLASSIFIED LIST OF MECHANICAL EQUIPMENT — Alphabetical List on page 150

Gears, Bakelite
* Foote Bros. Gear & Machine Co.
Ganschow, Wm. Co.
Nuttall, R. D. Co.

Gears, Bronze
* Foote Bros. Gear & Machine Co.
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Johnson, Carlyle Machine Co.
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Farrel Foundry & Machine Co.

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* Foote Bros. Gear & Machine Co.
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Gears, Herringbone
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Farrel Foundry & Machine Co.
* Fawcus Machine Co.
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Ganschow, Wm. Co.
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* James, D. O. Mfg. Co.
* Jones, W. A. Fdry. & Mach. Co.
* Kerr Turbine Co.
Link-Belt Co.
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* Westinghouse Electric & Mfg. Co.

Gears, Steel
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* Foote Bros. Gear & Machine Co.
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* James, D. O. Mfg. Co.
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* General Electric Co.
* Kerr Turbine Co.
Ridgway Dynamo & Engine Co.
* Sturtevant, B. F. Co.
* Westinghouse Electric & Mfg. Co.

Generators, Electric
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* De Laval Steam Turbine Co.
* Engberg's Electric & Mech. Wks.
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* Nordberg Mfg. Co.
Ridgway Dynamo & Engine Co.
* Westinghouse Electric & Mfg. Co.

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* Foster Engineering Co.
* Mason Regulator Co.

Governors, Engine, Oil
* Nordberg Mfg. Co.

Governors, Engine, Steam
* Nordberg Mfg. Co.

Governors, Oil Burner
* Foster Engineering Co.
* Mason Regulator Co.

Governors, Pressure
* Tagliabue, C. J. Mfg. Co.

Governors, Pump
* Bowser, S. F. & Co. (Inc.)
* Edward Valve & Mfg. Co.
* Foster Engineering Co.
* Kieley & Mueller (Inc.)
* Mason Regulator Co.
Squires, C. E. Co.
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* Casey-Hedges Co.
* Combustion Engineering Corp'n
* Erie City Iron Works
* Titusville Iron Works Co.
* Vogt, Henry Machine Co.

Grate Bars (for Overfeed and Underfeed Stokers)
Furnace Engineering Co.

Grates, Dumping
* Combustion Engineering Corp'n
* Titusville Iron Works Co.
* Vogt, Henry Machine Co.

Grates, Shaking
* Casey-Hedges Co.
* Combustion Engineering Corp'n
* Erie City Iron Works
* Springfield Boiler Co.
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* Irving Iron Works Co.

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(See Oil and Grease Cups)

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(See Separators, Oil)

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* Royersford Fdry. & Mach. Co.
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* Landis Machine Co. (Inc.)

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* Builders Iron Foundry
* Royersford Fdry. & Mach. Co.

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* Franklin Machine Co.
* Long & Allstatter Co.

Hammers, Pneumatic
* Ingersoll-Rand Co.

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Rockwood Sprinkler Co.

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Link-Belt Co.
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* S K F Industries (Inc.)

Hangers, Shaft (Roller Bearing)
* Hyatt Roller Bearing Co.
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* Erie City Iron Works
* Schutte & Koerting Co.
* Walsh & Weidner Boiler Co.
* Wheeler, C. H. Mfg. Co.
* Wheeler Cond. & Engrg. Co.
* Worthington Pump & Machinery Corp'n

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* Power Specialty Co.

Heaters and Purifiers, Feed Water, Metering
* Cochrane Corp'n

Heaters and Purifiers, Feed Water (Open)
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Elliott Co.
* Erie City Iron Works
Hoppes Mfg. Co.
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* Wickes Boiler Co.
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Palmer-Bee Co.
* Whiting Corp'n

Hoists, Belt
Clyde Iron Works Sales Co.
Lidgerwood Mfg. Co.

Hoists, Chain
Palmer-Bee Co.
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Lidgerwood Mfg. Co.
Link-Belt Co.
* Nordberg Mfg. Co.
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Lidgerwood Mfg. Co.

Hoists, Head Gate
Smith, S. Morgan Co.

Hoists, Locomotive & Coach
* Whiting Corp'n

Hoists, Mine
Lidgerwood Mfg. Co.
* Nordberg Mfg. Co.

Hoists, Skip
* Brown Hoisting Machinery Co.
Lidgerwood Mfg. Co.
Link-Belt Co.
Palmer-Bee Co.

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(See Engines, Hoisting)

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* United States Rubber Co.

Hose, Air and Gas
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* United States Rubber Co.

Hose, Fire
* United States Rubber Co.

Hose, Gas
* United States Rubber Co.

Hose, Gasoline
* Goodrich, B. F. Rubber Co.
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Hose, Metal, Flexible
Johns-Manville (Inc.)

Hose, Oil
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* United States Rubber Co.

Hose, Steam
* United States Rubber Co.

Hose, Suction
* United States Rubber Co.

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* Carrier Engineering Corp'n
* Sturtevant, B. F. Co.

Humidity Control
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* Carrier Engineering Corp'n
* Sturtevant, B. F. Co.
* Tagliabue, C. J. Mfg. Co.

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* Schutte & Koerting Co.

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* Taylor Instrument Cos

Hygrometers
* Tagliabue, C. J. Mfg. Co.
* Taylor Instrument Cos.
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* Frick Co. (Inc.)
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* Vogt, Henry Machine Co.

Ice Tools
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Idlers, Belt
Hill Clutch Machine & Fdry. Co.
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Kennedy Valve Mfg. Co.
* Reading Steel Casting Co. (Inc.)
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Indicators, CO
* Uehling Instrument Co.

Indicators, CO_2
Bacharach Industrial Instrument Co.
* Uehling Instrument Co.

Indicators, Engine
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Bacharach Industrial Instrument Co.
* Crosby Steara Gage & Valve Co.

Indicators, Sight Flow
* Bowser, S. F. & Co. (Inc.)

Indicators, SO_2
* Uehling Instrument Co.

Indicators, Speed
* American Schaeffer & Budenberg Corp'n
Veeder Mfg. Co.

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* Schutte & Koerting Co.

Injectors, Air
* Croll-Reynolds Engrg. Co.

Instruments, Electrical Measuring
* General Electric Co.
* Taylor Instrument Cos.
* Westinghouse Electric & Mfg. Co.

Instruments, Oil Testing
* Tagliabue, C. J. Mfg. Co.

*Catalogue data of firms marked * appear in the A.S.M.E. Condensed Catalogues of Mechanical Equipment, 1923-24 Volume*

FLYWHEELS

Rolling-Mill Engines. Heavy Flywheels for Rolling-Mill Engines (Schwere Schwungräder für Walzenzugmaschinen), Luck. Maschinenbau, vol. 3, no. 15, May 8, 1924, pp. 525–526, 3 figs. Based on drawings, best forms and materials for heavy flywheels are discussed.

FORESTRY

Fire-Statistics Collection. Some Suggestions for Proposed Changes in the Methods of Collecting Forest Fire Statistics, P. W. Stickel. Jl. of Forestry, vol. 22, no. 3, Mar. 1924, pp. 266–274. Discusses importance of forest-fire statistics in relation to question of forest-fire insurance, and suggests some changes in method of collecting such statistics. Bibliography.

Forest Colonization. Forest Colonization in Sweden, H. I. Baldwin. Jl. of Forestry, vol. 22, no. 3, Mar. 1924, pp. 241–257. Character of forest; climate. Primary object of colonization has been development of a settled population of forest workers. Relation between population and intensity of forestry; previous efforts at colonization in state forests; present grants for colonization; general extent and results of colonization. References.

Research. Use of Statistical Methods in Forest Research, J. Kittredge, Jr. Jl. of Forestry, vol. 22, no. 3, Mar. 1924, pp. 306–314. Author outlines what seems to him to be most promising statistical methods for use in forest research and gives examples of kinds of problems in which their application might prove useful. References.

FORGING

Safety Code for. Safety Code for Forging. Nat. Safety News, vol. 9, no. 6, June 1924, pp. 55–61, 23 figs. Tentative draft formulated under general auspices of Am. Eng. Standards Committee, to provide reasonable safety for life, limb and health. Applies to all power forging hammers and incidental operations in connection therewith, including hot saws.

FORGINGS

Testing Large. How English Test Big Forgings. Iron Trade Rev., vol. 74, no. 24, June 12, 1924, pp. 1557–1558, 4 figs. Stresses encountered by turbine rotors and other large forgings have led British steelmakers to examine core by means of special optical instrument; defects usually develop along axis.

FOUNDRIES

Quantity Production in. Practical Problems from the Foundry and Pattern Shop (Praktische Betriebsfragen aus der Giesserei und der Modellwerkstatt), König. Geisserei-Zeitung, vol. 21, no. 7, Apr. 1, 1924, pp. 121–124, 8 figs. Quantity production, for example, of electric-motor housings, by means of molding machines with use of green sand cores.

FUELS

Combined-Water Content in Solid. Content of Combined Water in Solid Fuels (Over het gebonden watergehalte van vaste brandstoffen), D. J. W. Kreulen. Chemisch Weekblad, vol. 21, no. 15, Apr. 12, 1924, pp. 174–176, 1 fig. Determination of dehydration curves of peat, lignite, and some 20 coals of recent formation; combined water can be detected by hygroscopic nature of dried fuel; those fuels which contain only colloidally held water are not hydroscopic when dried.

Heating Value. Direct Determination of Heating Value of Solid and Liquid Fuels (Détermination directe du Pouvoir calorifique des combustibles solides ou liquides), Ch. de la Condamine. Chaleur & Industrie, vol. 5, no. 46, Feb. 1924, pp. 85–91, 2 figs. Describes method and apparatus used; numerical example. Bibliography.

Sludge. Sewage Sludge as a Source of Heat. Contract Rec. & Eng. Rev., vol. 38, no. 20, May 14, 1924, pp. 478–479. Experiments carried out in England by burning sludge direct in a furnace and by utilizing gas made by carbonizing it; special furnace is solution.

[See also COAL; COKE; LIGNITE; OIL FUEL; PEAT; PULVERIZED COAL.]

FURNACES, INDUSTRIAL

Gas-Fired. Gas-Furnace Installations, Hems. Gas Jl., vol. 166, no. 3182, May 7, 1924, pp. 400–403, 1 fig. Describes some of the different types of furnaces and industrial apparatus which manufactures of a city demand, including oven and muffle furnaces, furnaces for melting, tube manufacture, sugar boiling, cyanide hardening, etc. Paper read before Midland Jr. Gas Assn.

Recuperators for. Recuperation—Design Requirements, E. R. Posnack. Combustion, vol. 10, no. 6, June 1924, pp. 439–440. Features of design which should be incorporated to eliminate objections usually raised to use of recuperators.

G

GAGES

Ordnance-Dept. Problems. Gage Problems of the Ordnance Department, C. C. Williams. Am. Mach., vol. 60, no. 22, May 29, 1924, pp. 791–793, 1 fig. Safeguarding gages on hand; studying allowances and tolerances; multiplicity of gages needed.

Sine Bar for Planer Work. The Sine Bar as a Universal Planing Gage, R. H. Rausch. Mech. Eng., vol. 46, no. 6, June 1924, pp. 345–348, 15 figs. Details of accurate system of gaging for use where large pieces are machined at comparatively long intervals; use of sine bar as templet for setting planer head and tools; formulas.

GALVANIZING

Fluxing. A Study of Fluxing in Galvanizing, H. Bablik. Metal Industry (Lond.), vol. 24, no. 23, June 6, 1924, pp. 541–543. Author describes tests carried out to determine mechanism of sal-ammoniac as a fluxing agent, from which he draws conclusions to guide in efficient control of a galvanizing bath.

GAS ENGINES

Starting and Starters. Gas Engine Starting and Starters, E. Pagett. Southern Engr., vol. 41, no. 3, May 1924, pp. 58–60, 7 figs. Explanation of various kinds of gas-engine starters and some of the difficulties encountered in starting an engine.

Temperature Distribution and Losses. Temperature Distribution and Losses during Combustion in Gas Engines (Die Temperaturverteilung sowie die Verluste während der Verbrennung bei Gasmotoren), Schmolke. Wärme, vol. 47, no. 15, Apr. 11, 1924, pp. 151–154, 1 fig. Method of determining temperature distribution in walls of Diesel engine under change of load, and explanation of heavy heat losses during combustion.

GAS PRODUCERS

Practice. Gas Producer Practice, W. Dyrrsen. Blast Furnace & Steel Plant, vol. 12, no. 6, June 1924, pp. 271–273. Savings possible by use of waste gases in place of steam for cooling fire zone; modern types of gas producers. (Abstract.) Paper presented before Am. Iron & Steel Inst.

Notes on Gas-Producer Practice, J. D. Troup. Iron & Coal Trades Rev., vol. 108, nos. 2929 and 2930, Apr. 18 and 25, 1924, pp. 631–632 and 678–679, 4 figs. British and American practice.

GAS TURBINES

Problems of. The Gas Turbine, H. Campbell. Inst. Mar. Engrs.—Trans., vol. 35, Apr. 1924, pp. 684–694 and (discussion) 694–701, 5 figs. Review of what is known about gas turbines up to date. Difficulties which have been experienced in dealing with gas turbines both theoretically and practically. Points out that a new material has to be found to stand high temperatures.

Waste-Heat Recovery. Gas Turbines for Waste Heat Recovery. Colliery Engr., vol. 1, no. 2, Apr. 1924, pp. 96–98, 4 figs. Notes on German developments with their possible applications to conditions in Great Britain.

GEAR CUTTING

Instrument. Cutting Instrument Gears. Machy. (Lond.), vol. 24, nos. 604 and 609, Apr. 24 and May 29, 1924, pp. 103–107 and 273–274, 17 figs. Apr. 24: Production of small gears by means of hand-operated and automatic machines of formed-cutter and hobbing types. May 29: Application of hobbing process and production of small pinions in rod form.

Racks. Rack Cutting. Machy. (Lond.), vol. 24, no. 608, May 22, 1924, pp. 235–237, 5 figs. General practice in cutting racks on machines designed for this work.

GRINDING

Methods. Grinding Shop Practice Described, F. B. Jacobs. Abrasive Industry, vol. 5, no. 5, May 1924, pp. 111–115, 11 figs. Methods followed at shops of L. Lawrence Co., Detroit, Mich. Worn cylinders reground and new pistons fitted; large crankshafts refinished by regrinding; broken units welded.

H

HAMMERS

Pneumatic. Pneumatic Hammers (Luftfhämmer), A. Halse. Werkstattstechnik, vol. 18, no. 9, May 4, 1924, pp. 251–255, 16 figs. Conditions governing choice of steam or pneumatic hammers; description with test results of Hartmann double-blow pneumatic hammers.

HARDNESS

Testing. Duration of Load in the Hardness Testing of Soft Metals (Bearing Metals) [Die Belastungsdauer bei der Härteprüfung weicher Metalle (Lagermetalle)], P. Leiber. Zeit. für Metallkunde, vol. 16, no. 4, Apr. 1924, pp. 128–131, 5 figs. Hardness determinations with different time durations of load; measurement of depth of indentation because of hardness differences inside of different sample pieces; experimental results and conclusions for practical application of ball test.

The Hardness of Metals and Hardness Testing. Mech. Eng., vol. 46, no. 6, June 1924, pp. 360–362. Observations on nature of hardness, together with descriptions of various methods used in testing. Report prepared at request of Special Research Committee on Cutting & Forming of Metals.

Work-Hardening of Various Metals, E. G. Herbert. Iron Age, vol. 113, no. 25, June 19, 1924, pp. 1792–1793, 3 figs. Measuring extent of progressive change with Herbert pendulum hardness tester.

HEALTH

Physiological Reactions to Air Cooling. Cooling Effect on Human Beings Produced by Various Air Velocities, F. C. Houghten and C. P. Yagloglou. Am. Soc. Heat. & Vent. Engrs.—Jl., vol. 30, no. 2, Feb. 1924, pp. 169–184, 13 figs. Study of relation of temperature, humidity and air motion to human comfort, giving details of tests and results obtained.

Physiological Reactions to High Temperatures. Air Motion—High Temperatures and Various Humidities—Reactions on Human Beings, W. J. McConnell and C. P. Yagloglou. Am. Soc. Heat. & Vent. Engrs.—Jl., vol. 30, no. 3, Mar. 1924, pp. 199–224, 19 figs. Results of experiments on physiological reactions to high temperatures and humidities, presented with the view of illustrating influence moving air exerts over still air.

HEAT PUMPS

Principle and Applications. The Heat Pump (Die Wärme-Pumpe), K. Schreber. Gesundheits-Ingenieur, vol. 47, nos. 14 and 15, Apr. 5 and 12, 1924, pp. 105–108 and 119–121, 8 figs. Heat pumps are described as plants with which, under use of mechanical work, heat quantities are heated from colder to warmer temperature; deals especially with concentrating plants, in which steam from solution is compressed and then used for heating solution which is to be concentrated; and heating plants in which working value of gases coming from grate is recovered as far as possible and used as work energy and for heating of rooms.

HEAT STORAGE

Applications in Industry. The Application of Heat Storage in Industry (Verwendbarkeit der Dampfspeicherung in der Industrie), Trautmann. Gesundheits-Ingenieur, vol. 47, no. 16, Apr. 19, 1924, pp. 137–139. Discusses different systems of heat storage, their useful possibilities, and advantages.

Hot-Water Accumulators. Heat Storage Plants in Connection with Boilers (Die Wärmespeicher in Verbindung mit Dampfkesseln), H. E. Witz. Wärme, vol. 47, no. 9, Feb. 29, 1924, pp. 83–87, 16 figs. Influence of pressure fluctuations and their elimination by use of hot-water accumulators; importance of such accumulators for maximum-pressure boilers.

HEAT TRANSMISSION

Buildings. Measuring Heat Transmission in Building Structures and a Heat Transmission Meter, P. Nicholls. Am. Soc. Heat. & Vent. Engrs.—Jl., vol. 30, no. 1, Jan. 1924, pp. 35–70, 30 figs. Deals with measurement of heat flow through walls, more particularly of existing structures. Outlines principles employed and describes in detail work done at A. S. H.-V. E. research laboratory in an attempt to develop a heat transmission meter which will indicate instantaneous flows. Difficulties involved in such measurements and variable factors in building materials that will influence heat-transmission constants. Short review of present state of knowledge, future requirements, and indications of probable trend of investigational work.

Thermal-Conductivity Values. New Tests on the Thermal Conductivity of Liquids, Insulating Materials and Metals (Nouveaux essais sur la conductibilité calorifique des liquides, matières isolantes et métaux), M. Jakob. Chaleur & Industrie, vol. 5, no. 46, Feb. 1924, pp. 62–65, 3 figs. Shows how to utilize to advantage relations between thermal properties of bodies and their employment in industry.

HEAT TREATMENT

Electrical Process. Annealing, Hardening, and Tempering by the Electrical Process. Machy. (Lond.), vol. 24, no. 609, May 29, 1924, pp. 263–265, 5 figs. Heat treatment of ferrous and non-ferrous wire and strip.

HEATING, ELECTRIC

Advantages and Uses. The Place of Electricity in the General Heating Field, L. P. Hynes. Am. Soc. Heat. & Vent. Engrs.—Jl., vol. 30, no. 1, Jan. 1924, pp. 17–24, 1 fig. Peculiar advantages of electric heat, and practical data for readily determining when and how to use it in solving some of the especially perplexing problems which confront heating engineer.

HEATING, HOT-AIR

Pipe Sizes. Principles of Design in Furnace Heating. Sheet Metal Worker, vol. 15, no. 10, June 6, 1924, pp. 373–376 and 404. Simplified method of determining leader sizes based on standard code for regulating installation of warm-air furnaces in residences.

HEATING, STEAM

Central. Central Station Heating Requirements, H. A. Woodworth. Power Plant Eng., vol. 28, no. 12, June 15, 1924, pp. 658–662, 7 figs. Conservation of fuel due to double use of steam, that is, for electric generation and commercial heating purposes; modern heating system at Grand Rapids, Mich.; modern underground construction.

The Economical Utilization of Heat from Central Station Plants, N. W. Calvert and J. E. Seiter. Am. Soc. Heat. & Vent. Engrs.—Jl., vol. 30, no. 1, Jan. 1924, pp. 1–16, 15 figs. Shutting off of steam at night and during day; thermostatic control; vacuum systems; building details for efficient heating; data on heat consumption; etc.

The Municipal Central Heating Station in Barmen, Germany (Das städtische Fernheizwerk Barmen), Schilling. Gesundheits-Ingenieur, vol. 47, nos. 15 and 17, Apr. 12 and 26, 1924, pp. 115–119 and 145–148, 10 figs. Details of boiler station consisting of 4 water-tube boilers, each having 180 sq. m. heating surface; steam pipe-line distribution system; steam pressure-reduction stations and stations for conversion of steam into hot water; operation of plant; numerous investigations show economy of central-heating system.

HOISTS

Mine. Novel Features of Electric Mine Hoists Recently Installed in Northern Ontario, H. V. Haight. Elec. News, vol. 33, no. 9, May 1, 1924, pp. 52–55, 5 figs. Details of two hoists recently built for use in Porcupine mining districts; double-drum type; controlled by compressed air; 250-hp. motor used in each case; liquid rheostat found most suitable.

HYDRAULIC MACHINERY

Glycerine, Use in. The Use of Glycerine in Hydraulic Machinery, F. Mercier. Mech. Eng., vol. 46, no. 6, June 1924, p. 353. Results of investigation.

Manufactured by Advertisers

CLASSIFIED LIST OF MECHANICAL EQUIPMENT

Alphabetical List on page 150

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* American Schaeffer & Budenberg Corp'n
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Lathes, Chucking
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Lathes, Engine
* Builders Iron Foundry

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Lubricators, Hydrostatic
* Crosby Steam Gage & Valve Co.
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Mechanical Stokers
(See Stokers)

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* General Electric Co.
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Meters, Flow
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* Bailey Meter Co.
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Meters, Pitot Tube
* American Blower Co.
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Meters, Steam
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* Cochrane Corp'n
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Garlock Packing Co.
* Goodrich, B. F. Rubber Co.
Johns-Manville (Inc.)

Packing, Centrifugal Pump
Garlock Packing Co.

Packing, Hydraulic
France Packing Co.
Garlock Packing Co.
* Goodrich, B. F. Rubber Co.
Johns-Manville (Inc.)

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Garlock Packing Co.
Johns-Manville (Inc.)

Packing, Rod (Piston and Valve)
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* Jenkins Bros.
Johns-Manville (Inc.)
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* Jenkins Bros.
Johns-Manville (Inc.)
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*Catalogue data of firms marked * appear in the A.S.M.E. Condensed Catalogues of Mechanical Equipment, 1923-24 Volume*

(Abstract.) Translated from Revue Industrielle, vol. 54, no. 29, Apr. 1924.

HYDRAULIC TURBINES

Characteristic Curves. The Characteristic Equations of Reaction and Impulse Water Turbines, H. W. Coultes. World Power, vol. 1, no. 5, May 1924, pp. 292–296, 5 figs. Shows how quantities are related and how equations can be obtained for characteristic curves of turbines.

Draft Tubes for. Draft Tubes for Hydraulic Turbines, J. M. Dymond. Univ. of Toronto Eng. Soc.—Trans. & Year Book, Apr. 1924, pp. 63–81, 10 figs. Functions of draft tubes; past types of draft tubes, and present outstanding types; present-day tendencies; special devices. List of references.

Factory. The Control of Power Production, Chas. L. Hubbard. Factory, vol. 32, no. 6, June 1924, pp. 822–825 and 908, 20 figs. Hydraulic turbines as factory power source.

Governors. Study of Speed Regulators of Hydraulic Turbines with Regard to Their Influence on Efficiency of Installations (Etude des régulateurs de vitesse des turbines hydrauliques au point de vue de leur influence sur le rendement global des installations), Cayère. Houille Blanche, vol. 23, no. 85–86, Jan.-Feb. 1924, pp. 10–18, 21 figs. Examination of three distinct elements of problem: Role of governors in maximum distribution of load among the different stations; in maximum utilization of hydraulic energy in plants having no reserve; and in maximum utilization of energy of plants having hydraulic reserve supply.

Hydroelectric Equipment. Recent Developments in Hydroelectric Equipment, Wm. M. White. Am. Inst. Elec. Engrs.—Jl., vol. 43, no. 6, June 1924, pp. 519–524, 10 figs. Facts relating to recent developments in hydroelectric machinery, such as that installed at power house at Mitchell Dam, Alabama.

HYDROELECTRIC DEVELOPMENTS

Carolinas. The Catawba River Development. Elec. World, vol. 83, no. 24, June 14, 1924, pp. 1234–1236, 1 fig. How hydroelectric power is utilized in Carolina to supply large group of textile industries; operating conditions.

Interdependence of Irrigation and. The Interdependence of Irrigation and Hydroelectric Power, J. D. Galloway. Jl. of Elec., vol. 52, no. 10, May 15, 1924, pp. 351–354, 2 figs. Exposition of relation of these two factors in Western development and of use of water for both purposes.

Italy. A Daring Engineering Feat Succeeds, C. Semenza. Explosives Engr., vol. 2, no. 5, May 1924, pp. 155–162, 14 figs. How Italian engineers solved unusual and difficult problem of connecting an outlet tunnel 65 ft. beneath surface of Lake Santa Croce.

LaGabelle, Can. Power Developments on S. T. Maurice River, L. H. Burpee. Can. Engr., vol. 46, no. 22, May 27, 1924, pp. 553–556 and 570, 6 figs. Existing hydroelectric plants on St. Maurice river produce 450,000 hp.; new development at LaGabelle will increase this by 150,000 hp. Some power-house construction details. Paper read at Toronto branch. Eng. Inst. Canada.

Sardinia. The Tirso Hydro-Electric Scheme. Elec. Rev., vol. 94, no. 2428, June 6, 1924, pp. 925–929, 8 figs. Describes dam, and power house and its equipment; equipped with two double turbines of 6000 b.hp. each, two double turbines of 9000 b.hp. each, and a small auxiliary turbine of 60 b.hp., which provides power for internal uses.

Scandinavia. Water Power in Scandinavia, F. Johnstone-Taylor. Elec. Times, vol. 65, no. 1691, Mar. 13, 1924, pp. 299–301, 7 figs. Brief outline of machinery of hydroelectric stations at Vamma, Herlandsfossen, Raanaafoss, and Nore Falls in Norway, and at Forshuvudforsen, Finspongs and Untraverket in Sweden, which have been put into operation within last three or four years, to give idea of present-day hydraulic-turbine practice in Northern Europe.

HYDROELECTRIC PLANTS

Automatic Operation. Present Practise in the Automatic Operation of Hydroelectric Generating Stations, R. J. Wensley. Am. Inst. Elec. Engrs.—Jl., vol. 43, no. 6, June 1924, pp. 508–513, 3 figs. Various methods of starting and controlling together with their limitations; sequence of operations in modern automatic switching equipment.

France. The Hydroelectric Plant at Eguzon (France) (L'Usine Hydroélectrique d'Eguzon), G. Laporte. Revue Industrielle, vol. 54, nos. 2174, 2176, 2178 and 2179, Jan., Mar., May and June, 1924, pp. 447–456, 1–5, 102–105 and 129–141, 34 figs. Details of work under construction for exploitation of Eguzon waterfall; dam is 60 ft. high at foot of which is located a plant with five sets of generators of 12,500 hp. each, which feeds three groups of transformers connected to transmission lines of Paris-Orleans railway.

Scheme of Arrangement. The Arrangement of Hydroelectric Plants of High and Medium Head (Quelques notes sur l'organisation des hautes et moyennes chutes d'eau), E. Maurein. Arts & Metiers, vol. 77, no. 43, Apr. 1924, pp. 126–135, 20 figs. Study of scheme of arrangement whereby weir pond is eliminated and head race is replaced by supply tunnel driven in mountain.

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ICE PLANTS

Charlestown, W. Va. Performance of a Modern Ice Plant, C. P. Goree, Jr. Refrig. Wld., vol. 59, no. 5, Apr. 1924, pp. 16–20, 7 figs. Description of 100-ton ice-making plant of Diamond Ice & Coal Co., Charlestown, W. Va., with complete operating results for June 1923.

Distilled-Water. Ice Plant Installs Unaflow Engines. Power, vol. 59, no. 25, June 17, 1924, pp. 981–982, 4 figs. Plant at Memphis, Tenn., economizes by purchasing governmental excess machinery; how water is treated; ice-storage facilities.

Oil Engines in. Oil Engines as a Prime Mover in the Ice Plant, C. T. Baker. Ice & Refrigeration, vol. 66, no. 5, May 1924, pp. 467–469. Discusses various features of primary interest to business man, including dependability, maintenance costs, different methods of drive, kind of fuel, etc. See also Refrig. Wld., vol. 59, no. 5, Apr. 1924, pp. 13–15.

IGNITION

Automobile Engines. Vacuum Tubes Applied to Engine Ignition. Automotive Industries, vol. 50, no. 24, June 12, 1924, pp. 1287–1289, 4 figs. Automotive application of thermionic valve, patented by Robert Bosch, makes it possible to place ignition system anywhere on car and eliminate mechanical interrupter.

INDUSTRIAL MANAGEMENT

Cost Control. Increased Yield from Industry (Voksende Udbytte i Industrien), I. Jantzen. Ingeniören, vol. 33, nos. 7 and 8, Feb. 16 and 23, 1924, pp. 73–84 and 85–96, 26 figs. Scientific investigation of economic factors on basis of engineering principles. Gives diagrams illustrating relations of manufacturing cost, price, profit, etc.

Production Control. Results of Scientific Management from the Viewpoint of Corporate Control, M. M. Baker. Mgt. & Administration, vol. 7, no. 6, June 1924, pp. 645–646. Discusses general effect of scientific management upon entire organization of manufacturing institution.

Records. The Works Records Department, W. J. Hiscox. Indus. Management (Lond.), vol. 11, nos. 1, 3, 6 and 10, Jan. 10, Feb. 7, Mar. 20 and May 15, 1924, pp. 6–7, 67–69, 151–152 and 265–266, 9 figs. Describes its function, dealing with delays, what records should show, stock records and costing, and employment records.

Suggestion System. A Suggestion System That Works, K. H. Condit. Am. Mach., vol. 60, no. 25, June 19, 1924, pp. 923–925, 4 figs. Description of system used by the Gilbreths; purpose is to secure from men on job suggestions for improvement in manufacturing methods; useful by-products of system.

INDUSTRIAL ORGANIZATION

Basic Principles. The Basic Principles of Organization, T. H. Jackson. Military Engr., vol. 16, no. 86, Mar.-Apr. 1924, pp. 95–99. Discusses decentralization, selection of group leaders, policy of command, creation of new groups, appointment of group leaders, specialist command, organizing around leaders, support of group leaders, and excessive overhead.

INTERNAL-COMBUSTION ENGINES

Naphthalene. Naphthalene Engines (Les moteurs à naphtaline), C. Anguenot. Société Industrielle de Mulhouse—Bul., vol. 90, no. 1, Jan. 1924, pp. 57–71, 6 figs. Describes types of engine for burning naphthalene, constructed by Société anonyme des moteurs économiques à naphthaline (A. A. M. E. N.), which are said to be particularly well adapted to light industry and farming.

Two-Cycle Double-Acting. A New Two-Cycle Double-Acting Engine (Un nouveau moteur à deux temps et à double effet), R. Mathieu. Outlilage, vol. 344, no. 3, Mar. 1924, pp. 17–18, 2 figs. Details of Leroy light explosion-type engine.

[See also AIRPLANE ENGINES; AUTOMOBILE ENGINES; DIESEL ENGINES; GAS ENGINES; OIL ENGINES.]

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Corrosion. The Relation of Hydrogen Ion Concentration to the Corrosion of Iron, J. W. Shipley and I. R. McHaffie. Can. Chem. & Metallurgy, vol. 8, no. 5, May 1924, pp. 121–124, 6 figs. Corrosion of iron in contact with graphite; corrosion of iron in absence of oxygen; corrosion of gray cast iron in soil water of pH 7.4 and saturated with oxygen; hydrogen-ion concentration obtained when iron is in contact with water; rate of corrosion of iron in absence of oxygen in solutions of various hydrogen-ion concentrations.

Electrolytic, Recrystallization. The Recrystallization of Electrolytic Iron (Die Rekristallisation des Elektrolyteisens), P. Oberhoffer and W. Oertel. Stahl u. Eisen, vol. 44, no. 20, May 15, 1924, pp. 560–561, 1 fig. Results of investigation at Iron Met. Inst. of Tech. High School of Aachen (Aix-la-Chappelle).

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Oxygen, Use in Production. The Use of Oxygen and Oxygenated Air in the Production of Pig Iron (Die Verwendung von Sauerstoff und sauerstoffreicher Luft bei der Roheisenerzeugung), R. Schenck. Stahl u. Eisen, vol. 44, no. 19, May 8, 1924, pp. 521–526, 3 figs. Reviews previous works and discusses phenomena in blast furnace and effect on them of nitrogen-free air and oxygen enrichment; summary of advantages to be gained by use of pure oxygen.

IRON CASTINGS

Cupola Mixtures for. Simplifying Cupola Mixtures, Geo. A. Drysdale. Foundry, vol. 52, no. 11, June 1, 1924, pp. 433–434. Claims that chemical composition of pig irons used should closely parallel that for castings required; uniform amounts used in cupola mixture produce more even product.

Monobloc Cylinder. Making a Monobloc Cylinder Casting. Eng. Production, vol. 7, no. 141, June 1924, pp. 176–180, 25 figs. Describes equipment designed for intensive manufacture of small monobloc cylinder castings of 63 mm. bore by 69 mm. stroke. Methods adopted to secure quality in quantity production.

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LATHES

High-Speed. Modern High-Speed Lathes. Eng. Progress, vol. 5, no. 5, May 1924, pp. 81–84, 9 figs. Design of headstock, feed gear, etc. of high-speed lathe manufactured by Heidenreich & Harbeck, Hamburg; comparison of economy with ordinary lathes.

Interchangeable Construction. Building Lathes Interchangeably, Chas. O. Herb. Machy. (N. Y.), vol. 30, no. 10, June 1924, pp. 758–761, 8 figs. Manufacturing methods used by Chard Lathe Co., New Castle, Ind., to facilitate assembly of machines and supply of replacement parts.

LIGHTING

Factories. The Relation of Illumination to Production, W. E. Bush. Eng. Production, vol. 7, no. 140, May 1924, pp. 124–129 (includes discussion), 14 figs. Foot-candle meter; shadows; illumination and vision; effect of light on output.

Industrial, Unit Costs of. Unit Costs of Industrial Lighting, D. H. Tuck. Illuminating Eng. Soc.—Trans., vol. 19, no. 5, May 1924, pp. 411–419 and (discussion) 419–423, 1 fig. Unit costs of installation and operation of various actual systems of lighting in industrial plants. Value of unit costs is in comparing economy of installation and operating costs of various types of lighting and in arriving at a quick estimate of cost of any industrial lighting installation when area to be illuminated, foot-candle intensity to be obtained and type of equipment to be used are known.

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Source of Heat. Lignite Fuel Source of Heat for Industries, W. Roth. Gas Age-Rec., vol. 53, no. 22, May 31, 1924, pp. 763–764. Recent development, in Germany, described by editor of Chemiker Zeitung, including gas from lignite, by-products from lignite, and lignite for central stations.

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Compressible, Vortex Motion in. The Vortex Motion in a Compressible Liquid (Ueber Wirbelbewegung in einer kompressiblen Flüssigkeit), A. Friedmann. Zeit. für angewandte Mathematik u. Mechanik, vol. 4, no. 2, Apr. 1924, pp. 102–107. Author derives equations on conditions of dynamic possibility of motion of a compressible liquid.

Heat Transfer. Heat Transfer vs. Agitation, D. E. Pierce and P. B. Terry. Chem. & Met. Eng., vol. 30, no. 22, June 2, 1924, pp. 872–873, 3 figs. Discusses use of agitation as means of increase of heating or cooling in places where it is difficult to provide more transfer surface.

Inflammable, Storage of. The Storage of Inflammable Liquids (Zur Frage der Lagerung feuergefährlicher Flüssigkeiten), A. Neuburger. Chemiker-Zeitung, vol. 48, no. 53, May 1, 1924, pp. 277–278. Describes Schilde-Eickemeyer system for storage of different kinds of inflammable liquids, including two kinds of pumping apparatus manufactured by firm of Benno Schilde, Berlin.

LOCOMOTIVE BOILERS

Flue Holes and Patches. Flue Holes and Patches, T. P. Tulin. Boiler Maker, vol. 24, no. 5, May 1924, pp. 134–135, 6 figs. Methods of installing flue "blinders" with welding process and flue-sheet patches.

LOCOMOTIVES

British Empire Exhibition. Locomotive Development, J. H. Brittain. Engineer, vol. 137, no. 3568, May 16, 1924, pp. 528–531, 9 figs. partly on supp. plate. Description and comparison of Lond. & North-Eastern Ry. (Great Northern) 3-cylinder locomotive, Flying Scotsman, Great Western 4-cylinder locomotive, Caerphilly Castle, both of which are exhibited at Brit. Empire Exhibition, and Vincent Raven's 3-cylinder Pacific, which is not exhibited.

Compound. 1 E Superheater Two-Cylinder Compound Locomotive of the Austrian Federal Railway-(1 E-Heissdampf-Zweizylinder-Verbundlokomotive der österreichischen Bundesbahnen), J. Rihosek. Organ für die Fortschritte des Eisenbahnwesens, vol. 79, no. 1, Jan. 15, 1924, pp. 8–11, 1 fig. Construction and characteristics of new freight locomotives.

Consolidation. Consolidation Type Locomotives for the Reading Company. Ry. & Locomotive Eng., vol. 37, no. 6, June 1924, pp. 179–180, 1 fig. Heavy consolidation 2–8–0 type built by Baldwin Locomotive Works; boiler is of Wootten type.

Daily Program and Performance. Daily Program and Performance of a Locomotive, R. S. Parsons. Ry. Rev., vol. 74, no. 20, May 17, 1924, pp. 884–886. Discussion from transportation viewpoint of locomotive performance in fast-freight, slow-freight and switching service. (Abstract.) Paper read before Central Ry. Club.

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Driving Boxes, Machining. Machining Driving Boxes, Shoes and Wedges. Ry. Rev., vol. 74, no. 23, June 7, 1924, pp. 1029–1039, 25 figs. Variations in design necessitate use of different practices in finishing these parts in railway machine shop.

Manufactured by Advertisers — CLASSIFIED LIST OF MECHANICAL EQUIPMENT — Alphabetical List on page 150

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Farrel Foundry & Machine Co.

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International Filter Co.
* Scaife, Wm. B. & Sons Co.

*Catalogue data of firms marked * appear in the A.S.M.E. Condensed Catalogues of Mechanical Equipment, 1923-24 Volume*

Electric. See ELECTRIC LOCOMOTIVES.

Mallet, Reconstruction of. Motive Power of the Carolina Clinchfield & Ohio Ry. Ry. Rev., vol. 74, no. 23, June 7, 1924, pp. 1005–1017, 7 figs. Describes rebuilding of original Mallet locomotives and makes comparison with two types of new engines.

Mechanical Draft. Report on Front-Ends, Grates and Ashpans, E. C. Schmidt. Ry. Rev., vol. 74, no. 23, June 7, 1924, pp. 999–1004, 6 figs. Devices for creating mechanical draft in locomotives and description of draft arrangements of oil-burning locomotive. (Abstract.) Report of committee to Int. Ry. Fuel Assn.

Staybolts. Oversize Staybolts for Locomotive Boilers (Im Gewinde dichte Stehbolzen). Glasers Annalen, vol. 94, nos. 9, 10 and 11, May 1, 15 and June 1, 1924, pp. 113–118, 123–129 and (discussion) 139–147, 37 figs. Different methods of expanding bolts in locomotive boilers so as to secure tight joints.

Steam-Turbine. Economy, Design and Development of the Steam-Turbine Locomotive (Die Turbolokomotive, ihre Wirtschaftlichkeit, Bauart und Entwicklung). R. P. Wagner. Organ für die Fortschritte des Eisenbahnwesens, vol. 79, nos. 1 and 2, Jan. 15 and Feb. 15, 1924, pp. 1–8 and 25–34, 17 figs. Discusses problems of design, and describes Ljungström, Ramsay and Zoelly types.

LUBRICATING OILS

Specific Heats. Specific Heats of Lubricating Oils, E. H. Leslie and J. C. Geniesse. Indus. & Eng. Chem., vol. 16, no. 6, June 1924, pp. 582–583, 1 fig. Measurement of specific heats of six typical lubricating oils over range of temperature from 37.78 to 143.33 deg. cent.

LUBRICATION

Economics. Economics of Lubrication—Suggestions for a Research Program, W. F. Parish. Nat. Petroleum News, vol. 16, no. 19, May 7, 1924, pp. 59–60 and 63. Deals with lubrication of steam railroads, electric roads, and farming, marine, automotive and industrial machinery.

M

MACHINE SHOPS

Economical Machining Methods. Analysis of a Machine-Shop Problem on a Quantity and Final-Economy Basis, A. L. DeLeeuw. Mech. Eng. vol. 46, no. 6, June 1924, pp. 335–338 and 362, 1 fig. Discusses nature of analysis which should be followed in determining most economical method of machining work, either in large or small quantities; deals only with items relating to actual machining processes; particular attention is called to difference between saving of labor cost and ultimate economy; as example some of operations on automobile connecting rod are taken. (Abridged.)

Single Pieces, Machining of. Economical Machining of Single Pieces, A. A. Dowd. Iron Age, vol. 113, no. 14, Apr. 3, 1924, pp. 989–991, 4 figs. Cause of loss in setting up machine tools for repair or replacement jobs; handling of work by planning department advantageous.

MACHINE TOOLS

British Empire Exhibition. The British Empire Exhibition. Machy. (Lond.), vol. 24, no. 608, May 22, 1924, pp. 241–250, 17 figs. Machine tools and mechanical equipment.

Magnetic Control. Electric Drive and Magnetic Control for Machine Tools, A. L. Harvey. Elec. Jl., vol. 21, no. 6, June 1924, pp. 265–269, 9 figs. Advantages of use of electric drive with magnetic control; reversing drive; suggestions in connection with operation.

Slotting Machines. Tooling Reciprocating Machine Tools. Eng. Production, vol. 7, no. 141, June 1924, pp. 166–169, 6 figs. Various methods of extending utility and scope of slotting machines.

MACHINERY

Stress in Parts. Optical Investigation of State of Stress in Machinery Parts with Sharp and with Rounded-Off Corners (Optische Untersuchung des Spannungszustandes in Maschinenteilen mit scharfen und abgerundeten Ecken), W. Birnbaum. Zeit. für technische Physik, vol. 5, no. 4, 1924, pp. 143–149, 20 figs. Apparatus consists of optical bench, upon which luminous source, polarization, load, and compensation apparatus, as well as photographic equipment are arranged on movable slides; special investigations on turbine-blade feet and T-pieces.

Torsional Oscillations. Investigation of Oscillations Around an Axis in a Machine (Beitrag zur Untersuchung von Drehschwingungen bei Maschinen), E. v. Brauchitsch. Zeit. für Technische Physik, vol. 4, no. 11, 1923, pp. 426–430, 5 figs. New method for analytical determination of natural frequency of each of the component parts of a rotating system and for investigation of oscillations in a torsional-elastic system.

MATERIALS HANDLING

Automobile Assembly. Material-Handling Problems Encountered in the Assembly of Automobiles, M. R. Denison. Mech. Eng., vol. 46, no. 6, June 1924, pp. 339–342. Time- and labor-saving methods devised for handling and inspection of raw materials and finished parts in large modern automobile-manufacturing plant; deals with functioning of stores divisions as service departments, loss of material, reductions effected in amount of clerical labor required, instruction of store-room men, location of store rooms, handling sheet metal, transportation, final car assembly, etc.

Glass Factories. Materials Handling in Glass Works (Materialbewegung in Glashütten), C. Michenfelder. Zeit. des Vereines deutscher Ingenieure, vol. 68, no. 21, May 24, 1924, pp. 515–519, 20 figs. Nature and quantity of material to be handled; problems connected with transport of coal, mixtures and glass.

Mechanical Equipment. Speeding Industrial Progress, M. W. Potts. Indus. Mgt. (N. Y.), vol. 67, no. 6, June 1924, pp. 348–355, 12 figs. How mechanical handling is revolutionizing all industry.

Metallurgical Works, Ruhr. Materials Handling in the Metallurgical Industry of the Ruhr (Les engins de manutention dans l'industrie de la Ruhr), R. de Boysson. Vie Tchnique & Industrielle, vol. 5, no. 54, Mar. 1924, pp. 365–371, 12 figs. Describes gantries and cranes employed in storage houses and yards, blast-furnace, rolling-mill equipment, and foundry equipment, inter-plant transportation, and private railways connecting mines and plants.

MEASUREMENTS

Shop. Shop Measurements, E. Buckingham. Univ. of Toronto Eng. Soc.—Trans. & Year Book, Apr. 1924, pp. 26–34. English standards of length; metric standards of length; purposes of shop measurement.

METALS

Intensity Distribution in Spectra of Alkali. Intensity Distribution, Term Sequence, and Exciting Function in the Spectra of the Alkali Metals (Intensitätsverteilung, Termfolge und Anregungsfunktion bei den Alkalispektren), H. Bartels. Zeit. für Physik, vol. 20, no. 6, Jan. 11, 1924, pp. 398–412, 3 figs. It is shown that by two simple assumptions a close relationship exists between exciting function of separate energy levels and term system of atom concerned.

Molten, Temperature Determination of. The Temperature Determination of Molten Metals, R. L. Binney and N. I. Terbille. Metal Industry (N. Y.), vol. 22, no. 5, May 1924, pp. 189–190. A combination of base-metal and rare-metal couples which proved trustworthy in brass foundry.

Notch Action, Reduction of. New Ways of Reducing Notch Action (Neue Wege zur Herabsetzung der Kerbwirkung), H. Kändler. Zeit. für technische Physik, vol. 5, no. 4, 1924, pp. 150–154, 7 figs. Influence of acid etching on notches in metal surfaces; etching of notches in chrome-nickel steel; increasing life of rods by etching treatment.

Sulphurizing and Desulphurizing of. Sulphurizing and Desulphurizing of Metals by Basic Slags and Fluxes, B. Bogitch. Metal Industry (Lond.), vol. 24, no. 21, May 23, 1924, pp. 498–499. Describes methods and results of experiments. Translated from French, and contributed at symposium arranged by Faraday Soc., Inst. Metals, Inst. British Foundrymen, and Non-Ferrous Research Assn.

Thermal Emissive Power. The Relation Between the Total Thermal Emissive Power of a Metal and Its Electrical Resistivity, C. Davisson and J. R. Weeks, Jr. Optical Soc. of Am.—Jl., vol. 8, no. 5, May 1924, pp. 581–605, 6 figs. Theoretical considerations. Details of experiments, and results obtained. Bibliography.

MOLDING METHODS

Propeller in Loam. Molding a Propeller in Loam, L. V. Johnston. Foundry, vol. 52, no. 11, June 1, 1924, pp. 446–448, 1 fig. Methods and rigging employed for purpose; necessity for skill and observance of care and accuracy.

MOLDING MACHINES

Squeezer. The Squeezer Molding Machine, R. E. Search. Metal Industry (N. Y.), vol. 22, no. 5, May 1924, pp. 191–194, 7 figs. Principles of this type of machine. Various makes and their applications.

MOTOR BUSES

International Harvester Co. International Bus Has Four-Wheel Air-Operated Brakes. Automotive Industries, vol. 50, no. 23, June 5, 1924, pp. 1216–1217, 2 figs. Chassis adapted for 30-passenger bodies, is furnished in three different gear ratios, and has ball-bearing removable cylinder sleeve engine and internal-gear final drive.

Lighting. Present Practice in Motor Bus Lighting and Suggestions for Improvement, L. C. Porter and A. C. Roy. Illuminating Eng. Soc.—Trans., vol. 19, no. 5, May 1924, pp. 456–471 and (discussion) 471–474, 14 figs. Points out lighting conditions as found in present practice and suggests way to improve these conditions. Advantages of glass reflector over enclosing-dome unit; coördination of battery, generator, body and lamp manufacturers in bringing about better lighting conditions.

Talbot. A Passenger Talbot. Motor Transport (Lond.), vol. 38, no. 1004, May 26, 1924, pp. 637–639, 6 figs. New 25–50-hp. chassis specially designed for passenger carrying; four-cylinder engine; overall length 19 ft., overall width 6 ft. 3 in.

Transportation with. Motorbus Transportation, A. E. Hutt. Soc. Automotive Engrs.—Jl., vol. 14, no. 6, June 1924, pp. 591–593. Outlines underlying principles of motor-bus transportation and makes suggestions concerning certain features conducive to successful operation.

MOTOR PLOWS

Development. The Motor Plow (Der Motorpflug), Th. Wolff. Automobil-Rundschau, vol. 23, nos. 3 and 4, Mar. and Apr. 1924, pp. 28–32 and 40–41, 4 figs. Review of development.

MOTOR-TRUCK TRANSPORTATION

Cost Calculation. Cost of Motor-Truck Transportation in Public Works (Cout des transports par camions automobiles dans les travaux publics), A. Mettler. Société des Ingenieurs civils—Mémoires et Compte Rendu des Travaux, vol. 76, no. 10–12, Oct.-Dec. 1923, pp. 1138–1144, 2 figs. Develops formula and chart for calculating cost of transportation of cubic meter of material for a given distance.

MOTOR TRUCKS

Electric. Why American Railway Express Uses 1,800 Electric Trucks, Rob. E. M. Cowie. Elec. World, vol. 83, no. 21, May 24, 1924, pp. 1084–1085. Definite reasons for adoption of electric transportation; fifteen specific advantages of electric truck as compared with gasoline and other types of vehicles are enumerated. (Abstract.) Address delivered before Nat. Elec. Light Assn.

German. A New Type of Motor Truck (Eine neue Lastkraftwagen-Konstruktion). Wirtschaftsmotor, vol. 6, no. 4, Apr. 25, 1924, pp. 5–8, 6 figs. Details of L. W. D. 3-ton truck.

Loading and Unloading. Loading and Unloading Bulk Materials to and from Motor Vehicles. Indus. Mgt. (Lond.), vol. 11, nos. 8, 9 and 10, Apr. 17, May 1 and 15, 1924, pp. 215–217, 246–249 and 277–279, 12 figs. Describes different methods.

London Gen. Omnibus Co. An L. G. O. Van. Motor Transport (Lond.), vol. 38, no. 1004, May 26, 1924, pp. 653–655, 9 figs. Particulars of a 15-cwt. van that Lond. Gen. Omnibus Co. has constructed for its own garage transport requirements.

Semi-Trailer Tanker. 3,000 Gallons by Semi-Trailer. Motor Transport (Lond.), vol. 38, no. 1005, June 2, 1924, pp. 664–666, 7 figs. Frameless semi-trailer tanker introduced by Scammell Lorries, Ltd., for fuel-oil transport and with other important possibilities.

Specifications. Gas Truck and Tractor Specifications. Power Wagon, vol. 32, no. 234, May 1924, pp. 40–47. Table giving specifications for different makes.

MOTORCYCLES

Vienna Show. Vienna Sport and Motorcycle Exhibition 1924 (Wiener Sport-und Motorradausstellung 1924). Allgemeine Automobil-Zeitung, vol. 25, no. 18, May 3, 1924, pp. 28–30, 5 figs. Details of exhibits.

N

NICKEL ALLOYS

Permalloy. The Reluctivity of the Recently Discovered Magnetic Metal Permalloy, A. E. Kennelly. Franklin Inst.—Jl., vol. 197, no. 5, May 1924, pp. 623–627, 2 figs. Gives data on observations of permalloy.

O

OFFICE MANAGEMENT

Standard Paper Forms. Standard Forms for Office and Shop Use. Mgt. & Administration, vol. 7, no. 6, June 1924, pp. 695–698, 1 fig. Notes on selection of paper and sizes of forms.

OIL ENGINES

Fullagar Land. The Fullagar Oil Engine for Land Purposes. World Power, vol. 1, no. 5, May 1924, pp. 305–309, 6 figs. Design and features of engine constructed by English Elec. Co.

Heavy Oil. The Fraser and Chalmers Heavy Oil Engine. Engineering, vol. 117, no. 3049, June 6, 1924, pp. 731–734, 10 figs. Totally enclosed forced-lubrication, vertical engine working on 4-stroke cycle with compressed-air injection; test results.

Production Methods. Production Methods on Large Oil Engines, L. S. Love. Iron Age, vol. 113, no. 25, June 19, 1924, pp. 1777–1782, 14 figs. Savings effected in use of some special machines; ingenious fixtures on standard machines help to reduce costs.

OIL FUEL

Ignition Point, Determination of. Determination of Ignition Point under Pressure (Bestimmung des Zündpunktes unter Druck), J. Tauss and F. Schutte. Zeit. des Vereines deutscher Ingenieure, vol. 68, no. 22, May 31, 1924, pp. 574–578, 11 figs. Two series of tests were carried out to determine ignition under any given pressure, first for constant and second for variable pressure; values obtained vary greatly and show that testing under pressure for investigation of motor oils and mixtures in laboratory is very useful.

OPEN-HEARTH FURNACES

Charging Equipment. Charging Devices in Modern Open-Hearth Plants (Beschickvorrichtungen in neuzeitlichen Martinwerken), E. Blau. Chemiker-Zeitung, vol. 46, no. 44, Apr. 10, 1924, pp. 222–225, 6 figs. Deals with trough charging machines and cranes and ingot charging and withdrawing cranes.

Extensions, Inland Steel Co. Increases Steel-making Capacity, E. C. Boehringer. Iron Trade Rev., vol. 74, no. 24, June 12, 1924, pp. 1566–1567, 3 figs. Extension at open-hearth department of Inland Steel Co. plant at Indiana Harbor, Ind.; augments output 18 per cent; charging doors and reversing valves electrically operated; describes new units.

Heat Losses in. Heat Losses in Open Hearth Furnaces, W. Dyrssen. Fuels & Furnaces, vol. 2, no. 6,

Manufactured by Advertisers — CLASSIFIED LIST OF MECHANICAL EQUIPMENT — Alphabetical List on page 150

Pyrometers, Electric
* American Schaeffer & Budenberg Corp'n
* Bristol Co.
* Crosby Steam Gage & Valve Co.
* Superheater Co.
* Taylor Instrument Cos.

Pyrometers, Expansion Stem
* Tagliabue, C. J. Mfg. Co.

Pyrometers, Optical
* Taylor Instrument Cos.

Pyrometers, Pneumatic
* Uehling Instrument Co.

Pyrometers, Radiation
* Taylor Instrument Cos.

Racks, Machine, Cut
* James, D. O. Mfg. Co.
* Jones, W. A. Fdry. & Mach. Co.
Nuttall, R. D. Co.

Radiators, Steam and Water
* American Radiator Co.
* Smith, H. B. Co.

Railways, Industrial
Easton Car & Construction Co.
Link-Belt Co.

Rams, Hydraulic
* Goulds Mfg. Co.
* Worthington Pump & Machinery Corp'n

Receivers, Air
* Ingersoll-Rand Co.
* Scaife, Wm. B. & Sons Co.
* Walsh & Weidner Boiler Co.
* Wheeler Cond. & Engrg. Co.
* Worthington Pump & Machinery Corp'n

Receivers, Ammonia
* Frick Co. (Inc.)

Recorders, CO
* Tagliabue, C. J. Mfg. Co.
* Uehling Instrument Co.

Recorders, CO_2
* Tagliabue, C. J. Mfg. Co.
* Uehling Instrument Co.

Recorders, SO_2
* Tagliabue, C. J. Mfg. Co.
* Uehling Instrument Co.

Recording Instruments
(See Instruments, Recording)

Reducing Motions
* Crosby Steam Gage & Valve Co.

Refractories
* Drake Non-Clinkering Furnace Block Co.
Keystone Refractories Co.
* King Refractories Co. (Inc.)
Maphite Sales Corp'n

Refrigerating Machinery
* De La Vergne Machine Co.
* Frick Co. (Inc.)
* Ingersoll-Rand Co.
Johns-Manville (Inc.)
* Nordberg Mfg. Co.
* Vilter Mfg. Co.
* Vogt, Henry Machine Co.
* Westinghouse Electric & Mfg. Co.

Regulators, Automatic Arc-Furnace
* Westinghouse Elect. & Mfg. Co.

Regulators, Blower
* Foster Engineering Co.
* Mason Regulator Co.

Regulators, Condensation
* Tagliabue, C. J. Mfg. Co.

Regulators, Damper
* Coppus Engineering Corp'n
* Fulton Co.
* Kieley & Mueller (Inc.)
* Mason Regulator Co.

Regulators, Electric
* General Electric Co.
* Westinghouse Electric & Mfg. Co.

Regulators, Fan Engine
* Foster Engineering Co.

Regulators, Feed Water
* Edward Valve & Mfg. Co.
Elliott Co.
* Kieley & Mueller (Inc.)
Squires, C. E. Co.

Regulators, Flow (Steam)
* Schutte & Koerting Co.

Regulators, Humidity
* Fulton Co.
* Tagliabue, C. J. Mfg. Co.

Regulators, Hydraulic Pressure
* Foster Engineering Co.
* Mason Regulator Co.

Regulators, Liquid Level
* Tagliabue, C. J. Mfg. Co.

Regulators, Pressure
* Edward Valve & Mfg. Co.
* Foster Engineering Co.
* Fulton Co.
* General Electric Co.
* Kieley & Mueller (Inc.)
* Mason Regulator Co.
* Tagliabue, C. J. Mfg. Co.
* Taylor Instrument Cos.

Regulators, Pump
(See Governors, Pump)

Regulators, Temperature
* Bristol Co.
* Fulton Co.
* Kieley & Mueller (Inc.)
* Sarco Co. (Inc.)
* Tagliabue, C. J. Mfg. Co.
* Taylor Instrument Cos.

Regulators, Time
* Tagliabue, C. J. Mfg. Co.

Regulators, Vacuum
* Foster Engineering Co.

Resistance Material (Electrical)
Driver-Harris Co.

Revolution Counters
(See Counters, Revolution)

Rings, Weldless
Cann & Saul Steel Co.

Rivet Heaters, Electric
* General Electric Co.

Riveters, Hydraulic
Mackintosh-Hemphill Co.

Riveters, Pneumatic
* Ingersoll-Rand Co.

Riveting Machines
* Long & Allstatter Co.

Roller Bearings
(See Bearings, Roller)

Rolling Mill Machinery
Farrell Foundry & Machine Co.
Mackintosh-Hemphill Co.
Treadwell Engineering Co.

Rolls, Bending
* Niagara Machine & Tool Works

Rolls, Crushing
Farrel Foundry & Machine Co.
Link-Belt Co.
* Worthington Pump & Machinery Corp'n

Rolls, Rubber
* Goodrich, B. F. Rubber Co.
* United States Rubber Co.

Rolls, Steel
Mackintosh-Hemphill Co.

Roofing
Johns-Manville (Inc.)

Roofing, Asbestos
Johns-Manville (Inc.)

Rope, Hoisting
Clyde Iron Works Sales Co.
* Roebling's, John A. Sons Co.

Rope, Transmission
Hill Clutch Machine & Fdry. Co.
Link-Belt Co.
* Roebling's, John A. Sons Co.

Rope, Wire
Clyde, Iron Works Sales Co.
Hill Clutch Machine & Fdry.Co.
* Roebling's, John A. Sons Co.

Rope Drives
* Allis-Chalmers Mfg. Co.
* Brown, A. & F. Co.
* Falls Clutch & Machinery Co.
Hill Clutch Machine & Fdry. Co.
Link-Belt Co.
* Medart Co.
* Wood's, T. B. Sons Co.

Rubber Goods, Mechanical
* Goodrich, B. F. Rubber Co.
* Jenkins Bros.
* United States Rubber Co.

Rubber Mill Machinery
Farrel Foundry & Machine Co.

Sand Blast Apparatus
* De La Vergne Machine Co.

Saw Mill Machinery
* Allis-Chalmers Mfg. Co.

Saw Mills, Portable
* Frick Co. (Inc.)

Scales, Fluid Pressure
* Crosby Steam Gage & Valve Co.

Screens, Perforated Metal
* Hendrick Mfg. Co.

Screen, Revolving
* Allis-Chalmers Mfg. Co.
Chain Belt Co.
* Gifford-Wood Co.
* Hendrick Mfg. Co.
Link-Belt Co.
* Smidth, F. L. & Co.

Screens, Shaking
* Allis-Chalmers Mfg. Co.
Chain Belt Co.
* Gifford-Wood Co.
* Hendrick Mfg. Co.
Link-Belt Co.

Screens, Water Intake (Traveling)
Chain Belt Co.
Link-Belt Co.

Screw Cutting Dies
(See Dies, Thread Cutting)

Screw Machines, Hand
* Jones & Lamson Mach. Co.
* Warner & Swasey Co.

Screws, Cap
* Scovill Mfg. Co.

Screws, Safety Set
Allen Mfg. Co.
* Bristol Co.

Screws, Set
Allen Mfg. Co.

Separators, Ammonia
* De La Vergne Machine Co.
Elliott Co.
* Frick Co. (Inc.)
* United Machine & Mfg. Co.
* Vogt, Henry Machine Co.

Separators, Compressed Air
* United Machine & Mfg. Co.

Separators, Oil
Bethlehem Shipbldg.Corp'n(Ltd.)
* Cochrane Corp'n
* Crane Co.
* De La Vergne Machine Co.
Elliott Co.
Hoppes Mfg. Co.
* Kieley & Mueller (Inc.)
* United Machine & Mfg. Co.
* Vogt, Henry Machine Co.

Separators, Steam
* Cochrane Corp'n
* Crane Co.
Elliott Co.
Hoppes Mfg. Co.
* Kieley & Mueller (Inc.)
* Pittsburgh Valve, Fdry. & Const. Co.
* United Machine & Mfg. Co.
* Vogt, Henry Machine Co.

Shafting
* Allis-Chalmers Mfg. Co.
* Brown, A. & F. Co.
Cumberland Steel Co.
* Falls Clutch & Mchry. Co.
Hill Clutch Machine & Foundry Co.
* Medart Co.
Union Drawn Steel Co.
* Wood's, T. B. Sons Co.

Shafting, Cold Drawn
Hill Clutch Machine & Fdry. Co.
* Medart Co.

Shafting, Flexible
* Gwilliam Co.

Shafting, Turned and Polished
Cumberland Steel Co.
Hill Clutch Machine & Fdry. Co.
Link-Belt Co.

Shapes, Brick
* McLeod & Henry Co.

Shapes, Cold Drawn Steel
Union Drawn Steel Co.

Shears, Alligator
Farrel Foundry & Machine Co.
* Long & Allstatter Co.
* Royersford Foundry & Machine Co.

Shears, Hydraulic
Mackintosh-Hemphill Co.

Shears, Plate
* Long & Allstatter Co.
Mackintosh-Hemphill Co.

Shears, Rotary
* Niagara Machine & Tool Works

Sheaves, Rope
* Brown, A. & F. Co.
Clyde Iron Works Sales Co.
* Falls Clutch & Machinery Co.
Hill Clutch Machine & Fdry. Co.
* Jones, W. A. Fdry. & Mach. Co.
Link-Belt Co.
Mackintosh-Hemphill Co.
* Medart Co.
* Nordberg Mfg. Co.
* Wood's, T. B. Sons Co.

Sheet Metal Work
* Allington & Curtis Mfg. Co.
* Hendrick Mfg. Co.

Sheet Metal Working Machinery
Farrel Foundry & Machine Co.
* Niagara Machine & Tool Works

Sheets, Brass
* Scovill Mfg. Co.

Sheets, Bronze
* Hendrick Mfg. Co.

Sheets, Rubber, Hard
* Goodrich, B. F. Rubber Co.
* United States Rubber Co.

Sheets, Steel
Central Steel Co.

Siphons (Steam-Jet)
* Schutte & Koerting Co.

Slide Rules
Dietzgen, Eugene Co.
Electro Sun Co. (Inc.)
Keuffel & Esser Co.
New York Blue Print Paper Co.
ParVell Laboratories
U. S. Blue Co.
Weber, F. Co. (Inc.)

Smoke Recorders
* Sarco Co. (Inc.)

Smoke Stacks and Flues
(See Stacks, Steel)

Sockets, Wire Rope
(See Wire Rope Fastenings)

Soot Blowing Systems
Diamond Power Specialty Corp'n

Space Heaters
* Westinghouse Elec. & Mfg. Co.

Special Machinery
* Brown, A. & F. Co.
* Builders Iron Foundry
* Cramp, Wm. & Sons Ship & Engine Bldg. Co.
Farrel Foundry & Machine Co
* Fawcus Machine Co.
* Franklin Machine Co.
Hill Clutch Machine & Fdry. Co.
Lammert & Mann
Mackintosh-Hemphill Co.
* Nordberg Mfg. Co.
* Smidth, F. L. & Co.
* Vilter Mfg. Co.

Speed Reducing Transmissions
* Cleveland Worm & Gear Co.
* De Laval Steam Turbine Co.
* Foote Bros. Gear & Machine Co.
* General Electric Co.
Hill Clutch Machine & Foundry Co.
* James, D. O. Mfg. Co.
* Jones, W. A. Fdry. & Mach. Co.
Link-Belt Co.
Palmer-Bee Co.

Spray Cooling Systems
* Cooling Tower Co. (Inc.)

Sprays, Water
* Cooling Tower Co. (Inc.)

Sprinkler Systems
Rockwood Sprinkler Co

Sprinklers, Spray
* Cooling Tower Co. (Inc.)

Sprockets
Baldwin Chain & Mfg. Co.
* Diamond Chain & Mfg. Co.
* Foote Bros. Gear & Machine Co.
* Gifford-Wood Co.
Hill Clutch Machine & Mfg.Co
Link-Belt Co.
* Medart Co.
Philadelphia Gear Works

Stacks, Steel
* Bigelow Co.
* Casey-Hedges Co.
* Cole, R. D. Mfg. Co.
* Hendrick Mfg. Co.
Morrison Boiler Co.
* Titusville Iron Works Co.
* Union Iron Works
* Vogt, Henry Machine Co.
* Walsh & Weidner Boiler Co.

Stair Treads
* Irving Iron Works Co.

Stampings, Sheet Metal
Rockwood Sprinkler Co.

Standpipes
* Cole, R. D. Mfg. Co.
Golden-Anderson Valve Specialty Co.
Morrison Boiler Co.
* Walsh & Weidner Boiler Co.

Static Condensers
* Westinghouse Elect. & Mfg. Co.

Steam Specialties
* Crane Co.
* Foster Engineering Co.
* Fulton Co.
Golden-Anderson Valve Specialty Co.
* Kieley & Mueller (Inc.)
Lunkenheimer Co.
* Pittsburgh Valve, Fdry. & Const. Co.
* Sarco Co. (Inc.)

Steel, Alloy
Cann & Saul Steel Co.
Central Steel Co.
Union Drawn Steel Co.

Steel, Bar
Cann & Saul Steel Co.
Central Steel Co.

Steel, Bright Finished
Union Drawn Steel Co.

Steel, Chrome
Central Steel Co.

Steel, Chrome Nickel
Central Steel Co.

Steel, Chromium Alloy
Central Steel Co.

*Catalogue data of firms marked * appear in the A.S.M.E. Condensed Catalogues of Mechanical Equipment, 1923-24 Volume*

June 1924, pp. 565–569, 3 figs. Heat balance showing how 40 per cent of heat in fuel may be obtained in total steam in a furnace without gas checkers passing part of waste gases from melting chamber direct to boiler.

OXY-ACETYLENE WELDING

Cast Iron, Bronze Welding of. A New Field for the Oxy-Acetylene Process. Acetylene Jl., vol. 25, no. 11, May 1924, pp. 533–536, 9 figs. Bronze welding of cast iron pipe. Bronze welding overcomes practically all of the difficulties of preheating in the field and enables construction of cast-iron lines upon an economic basis.

P

PAPER

Analysis. Rapid Analysis of Paper, J. Crolard. Paper, vol. 34, no. 3, May 8, 1924, pp. 87–89. Necessary conditions in analysis of sizing substances and description of methods employed. From Moniteur de la Papetrie Française.

Coated, Analysis of. Analysis of Coated Papers. Paper, vol. 34, no. 2, May 1, 1924, pp. 48–51. Methods available to paper chemists for ready determination and estimation of binding materials and surface coatings used in manufacture of coated paper.

PAPER MACHINERY

Newsprint Machines. Anti-Friction Bearings on High-Speed Newsprint Machines, G. H. Spencer. Paper Trade Jl., vol. 78, no. 22, May 29, 1924, pp. 46–49, 11 figs. Fundamentals of plain and of anti-friction bearings, and advantages of anti-friction bearings. Paper read at Am. Pulp & Paper Mill Supts.' Assn. convention. See also Wood Pulp News, vol. 48, no. 23, June 7, 1924, pp. 16, 18 and 38, 8 figs.

Suction Rolls on News Machines, W. H. Theroux. Paper Mill, vol. 48, no. 21, May 24, 1924, pp. 44, 46 and 48. Treatment of subject from papermaker's standpoint.

The Modern News Print Machine, A. N. Russell. Paper Mill, vol. 48, no. 22, May 31, 1924, pp. 26, 28 and 30. Discusses recent improvements, including Fourdriniers, improvements in press sections and in dryer section, etc.; advantages to be derived from driving paper machines by sectional electric drive.

PAPER MANUFACTURE

Beaters. Shartle Continuous Beater. Paper, vol. 34, no. 2, May 1, 1924, pp. 38–39, 8 figs. Describes new invention providing a battery of beaters for continuous operation in combination with raw stock breaker for manufacture of paperboard.

Drying. Drying Paper, F. C. Stamm and E. P. Gleason. Paper Trade Jl., vol. 78, no. 21, May 22, 1924, pp. 54–56, 5 figs. Discusses briefly drying methods in use today and brings out factors affecting drying. Outlines simple method of detecting some of the faults most commonly found. Paper read at Am. Pulp & Paper Mills Supts.' Assn. annual convention.

Photographic Paper. Making Photographic Paper, E. Arnould. Paper, vol. 24, no. 4, May 15, 1924, pp. 137–140. Details of its manufacture and characteristic properties; preparation of pulps calls for extra care in preventing contamination by iron; difficulties in sizing and coating; preferred tinting substances.

Pulp, Decay of. Decay of Wood and Groundwood Pulp, M. W. Bray. Paper Trade Jl., vol. 78, no. 23, June 5, 1924, pp. 58–60, 3 figs. Relation of loss in weight to chemical properties.

Pulp Manufacture. Soda Pulp Production, H. J. Payne. Chem. & Met. Eng., vol. 30, no. 21, May 26, 1924, pp. 817–822, 11 figs. Survey of methods and equipment, with emphasis on recent developments.

Pulp Sources. Sources of Pulp in North America. G. J. Druckerman. Paper Trade Jl., vol. 78, nos. 23 and 24, June 5 and 12, 1924, pp. 44, 46, 48, 50 and 82; and 36, 38 and 64, 2 figs. Compilation of statistics relating to North American resources in wood and woody substitutes for manufacture of paper.

The Use of Wood of the Common Fir in the Manufacture of Wood Pulp and Cellulose (Eignung von Tannenholz zu Holzstoff und Cellulose), W. Freund. Chemiker-Zeitung, vol. 48, no. 53, May 1, 1924, pp. 279–280. Although wood of common fir is very similar to that of spruce, it finds little application in manufacture of wood pulp and cellulose, chiefly because its fibers are coarser than those of spruce wood; in winter, however, the fibers are shorter and finer than in summer; pulp produced from fir wood has much more constant and stable color than that produced from spruce wood, and is very suitable for soda pulp or for steamed mechanical pulp for leather board.

Water Removal. Removal of Water by Couch System. Paper, vol. 34, no. 8, June 12, 1924, pp. 328–329. Account of new system of operating couch rolls on a paper machine, in which mechanism of water removal is described in connection with a new vacuum system recently patented in Germany. How pressure of roll acts in abstraction of water from sheet and affects speed of machine.

PAPER MILLS

Electric Drive. Application of Electric Drive to Finishing Room Machinery, O. C. Cordes and W. W. Spratt. Paper Mill, vol. 48, no. 21, May 24, 1924, pp. 50 and 52. Covers, in a general way, machinery used in finishing room, touching on the various methods of electric drive and discussing their relative merits.

Rubber Bearings, Application of. The Adaption of "Cutless" Rubber Bearings to Pulp and Paper Mill Use, C. F. Sherwood. Paper Mill, vol. 48, no. 21, May 24, 1924, pp. 34, 36 and 48. It is impossible to imbed sand or grit in smooth resilient surface of live Olivite rubber, which is used in making rubber bearings. Construction of "cutless" rubber bearings, and its use in pulp and paper mills.

Sulphite Mills, Steam Economy in. Heat Problems in a Sulphite Mill, A. H. Lundberg. Paper Trade Jl., vol. 78, no. 22, May 29, 1924, pp. 41–45. Actual steam consumption for cooking, bleaching and drying of sulphite pulp and possibilities of savings. Paper read at Am. Pulp & Paper Mill Supts.' Assn. convention. See also Paper Mill, vol. 48, no. 21, May 24, 1924, pp. 14–16, 62 and 64.

PEAT

Industrial Uses, Germany. Industrial and Agricultural Use of Peat Bog (Industrielle und landwirtschaftliche Moornutzung), G. Keppeler. Zeit. des Vereines deutscher Ingenieure, vol. 68, no. 22, May 31, 1924, pp. 585–591, 10 figs. Discusses uses of German peat bog, its origin, peat production and briquetting, refinement, gasification and distillation.

PISTONS

Accurate, Securing. Maxwell Method of Securing Accurate Pistons, F. H. Colvin. Am. Mach., vol. 60, no. 24, June 12, 1924, pp. 873–874, 4 figs. Novel chuck by which piston is squared with piston-pin hole before final turning; gages used in measuring checking and grading.

Inwardly Sprung Rings. The Design of Piston Rods and Pistons with Inwardly Sprung Piston Rings (Gestaltung der Kolbenstangen und Kolben mit nach innen federnden Kolbenringen), O. Graf. Maschinenbau, vol. 3, no. 15, May 8, 1924, pp. 520–522, 7 figs. Characteristics of inwardly sprung piston rings; examples of application to piston rods and pistons; stress curve; stress and diameter measuring instrument; universal piston-ring diameter; measuring clock.

PLATES

Elastic Deformation. Elastic Deformation of a Uniformly Loaded Contour-Supported Thick Plate (Plaques rectangulaires épaisses), C. A. Garabedian. Acad. des Sciences—Comptes Rendus, vol. 178, no. 7, Feb. 11, 1924, pp. 619–622. Author indicates his method of investigation by employment of series, as previously applied by him to investigation of circular plates; also gives complete solution for displacements. Note by Mesnager calls attention to interest and importance of work.

PNEUMATIC TOOLS

Repair and Upkeep. Repair and Upkeep of Pneumatic Tools, R. W. Wilson. Instn. Mech. Engrs.—Proc., no. 2, Jan. 1924, pp. 151–163 and (discussion) 163–207, 19 figs. Consideration of what is necessary to maintain in efficient operation and in economical service pneumatic tools commonly used in engineering workshops and shipbuilding yards; these are roughly classified as reciprocating tools or pneumatic hammers, and rotating tools or pneumatic drills.

POWER GENERATION

Steam. Modern Steam Power Generation, R. W. Angus. Univ. of Toronto Eng. Soc.—Trans. & Year Book, Apr. 1924, pp. 35–41, 3 figs. Brief discussion of some of the developments in economical generation of power by steam made during past 10 years, including bleeding of steam from turbines, mercury turbines, etc.

PULVERIZED COAL

Alpine Anthracite. The Alpine Anthracite and Its Use as Powdered Fuel, M. Dagallier. Fuel, vol. 3, no. 5, May 1924, pp. 151–160. Combustion of anthracite on grate as steam coal—results obtained; observations on combustion of pulverized anthracite; boiler firing by pulverized fuel; use of pulverized fuel in rotary cement kilns; firing of metallurgical furnaces by pulverized fuel. Paper read at Congrès de Chauffage Industriel in Paris, 1923.

Combustion. The Combustion of Pulverized Coal, E. Audibert. Colliery Guardian, vol. 127, no. 3306, May 9, 1924, pp. 1188–1189, 3 figs. Results obtained up to the present in a study, made by Comité Centrale des Houillères de France, of combustion of pulverized coal, with object of ascertaining precautions to be observed in its application to boiler firing. Primary object of experiments were measurement of duration of combustion, and determination of essential conditions for use of a given coal in form of powder. From Revue de l'Industrie Minérale.

Developments and Advantages. Pulverized Fuel and Efficient Steam Generation, D. Brownlie. Instn. Elec. Engrs.—Jl., vol. 62, no. 329, May 1924, pp. 385–418 and (discussion) 418–469, 1 fig. Detailed consideration of latest developments in use of pulverized coal for steam generation, and comparison of its advantages and disadvantages as compared with mechanical stoking under most modern conditions; full account of Lakeside station at Milwaukee with exact working costs, and description of River Rouge plant at Dearborn, Detroit, as representatives of modern pulverized-fuel practice; comparison with Dalmarnock power station, Glasgow, characteristic of best British mechanical-stoker practice; in author's opinion advantages of pulverized fuel are so great that they constitute almost revolution in boiler practice.

Heating Furnaces, Use in. The Prospects of Pulverized-Coal-Fired Heating Furnaces in Rolling Mills (Aussichten der Staubfeuerung an Wärmeöfen in Walzwerken), H. Hochgesand. Wärme, vol. 47, nos. 12, 13, 14, 15 and 16, Mar. 21, 28, Apr. 4, 11 and 18, 1924, pp. 117–119, 128–132, 141–144, 154–157 and 166–169, 14 figs. Investigation on an ingot-heating furnace with former half-gas firing; influence of fineness of grinding and size of chamber on furnace efficiency and coal consumption; economy of pulverized-coal over half-gas firing; discussion of results.

Physical Properties. A Study of the Physical Properties of Powdered Coal of Varying Degrees of Fineness; and of the Distribution of Ash and Volatile Matter among the Fractions of Different Size, Chas. Roszak. Fuel, vol. 3, no. 5, May 1924, pp. 161–165, 7 figs. Paper read at Congrès de Chauffage Industriel in Paris, 1923. See reference to original article in Eng. Index 1923, p. 526.

Use, Development in. Development in Use of Pulverized Coal, C. F. Herington. Elec. Light & Power, vol. 2, no. 5, May 1924, pp. 121–125 and 166, 6 figs. Review of development of its use in industrial furnaces, boilers, locomotives, etc.; comparisons between pulverized coal and other fuels; future possibilities.

PUMPING STATIONS

Diesel-Engine Operation. Operating Experiences of a Diesel Engine Pumping Station, W. De Witt Vosbury. Fire & Water Eng., vol. 75, no. 23, June 4, 1924, pp. 1215, 1219 and 1224, 4 figs. Statistics showing experiments in use of Diesel engine in Gloucester, N. J., station, a typical small water-works pumping station.

Electrically Driven. Illinois Central Builds Modern Pumping Station, C. R. Knowles. Ry. Age, vol. 76, no. 26, May 31, 1924, pp. 1309–1311, 3 figs. Facilities at Clinton, Ill., consist of three deep wells equipped with turbine pumps and 50,000-gal.-per-hr. water softener, all of which are electrically driven, together with filters, pipe lines, and additional storage tank having capacity of 100,000 gal. See also Ry. Eng. & Maintenance, vol. 20, no. 6, June 1924, pp. 233–236, 5 figs.

Irrigation. An Electrically Operated Irrigation Plant, C. W. Geiger. Nat. Engr., vol. 28, no. 6, June 1924, pp. 259–261, 3 figs. Description of irrigation pumping plant of River Farms company in California; capacity 504,000,000 gal. per day; screw pumps designed to operate very efficiently at low heads and driven by synchronous motors constitute present equipment.

Irrigation Pumping Machinery (Gezira Scheme), Sudan, R. W. Allen. Engineering, vol. 117, nos. 3046 and 3047, May 16 and 23, 1924, pp. 654–656 and 685–687, 11 figs. Object of scheme is to provide, for purpose of growing cotton, irrigation of northern portion of Gezira plain; construction details of Wad-el-Nau pumping station; drainage arrangements; suction wells and pipes; discharge pipes; labor employed on erection; trials of machinery. See also Engineer, vol. 137, no. 3568, May 16, 1924, pp. 549–550, 5 figs.

PUMPS

Air-Lift. An Experimental Study of Air-Lift Pumps, C. N. Ward. Eng. & Contracting (Water Works), vol. 61, no. 6, June 11, 1924, pp. 1273–1278, 6 figs. Conclusions from investigation of 13 air-lift pumps at hydraulic laboratory of Univ. of Wis.

Gas. In This Gas Pump Water Acts as a Piston, F. J. Taylor. Fire & Water Eng., vol. 75, no. 20, May 14, 1924, pp. 1001, 1054 and 1056, 4 figs. An English self-contained internal-combustion gas pump, resulting energy of which is used to pump water without assistance of connecting rod, crankshaft or other parts.

PUMPS, CENTRIFUGAL

Electric vs. Steam Drive. Electric Motors for Driving Centrifugal Water Pumps, E. G. Sohlberg. Chem. & Met. Eng., vol. 30, no. 21, May 26, 1924, pp. 832–833, 3 figs. Comparison of cost of pumping water by this method, using central-station current with steam turbine and engine drives.

R

RAILS

Rupture. Split Head Type of Rail Rupture. Railroad Herald, vol. 28, no. 6, May 1924, pp. 26–28, 2 figs. Abstract of report of J. E. Howard, on accident which occurred Nov. 21, 1923 on Phila. & Reading Ry., near Annville, Pa., which was due to fracture of a rail which displaced a split-head type of rupture.

Steel, Milling. Late Developments in Steel Rail Practice, C. W. Gennet, Jr. Iron Age, vol. 113, no. 24, June 12, 1924, pp. 1721–1722. Lengths of 39 ft. with ends milled; tie plates, from steel from top of ingots; improved hot-bed treatment regarded important.

Wheel Stress on. The Otheograph of the General Electric Company. Ry. & Locomotive Eng., vol. 37, no. 6, June 1924, pp. 163–168, 5 figs. Instrument designed to measure lateral and vertical stresses imposed on rails.

RAILWAY ELECTRIFICATION

Switzerland. Main Line Railway Electrification, Phil. Dawson and S. Parker Smith. Engineer, vol. 137, no. 3571, June 6, 1924, pp. 633–636, 23 figs. partly on supp. plate. Electrification of Swiss railways; reasons for electrification; choice of system; tabular data on electric rolling stock on Swiss railways; present state of electrification; Berne-Loetschberg-Simplon railway. Includes tabular data on supp. plate of different lines.

Virginian Ry. The Virginian Railway Electrification, H. K. Smith. Ry. Age, vol. 76, no. 27, June 7, 1924, pp. 1353–1358, 9 figs. Outline of conditions which caused management to adopt electric traction; electric locomotives; plan of operation with electric locomotives; power equipments; transmission and distribution system. See also Ry. Elec. Engr., vol. 15, no. 6, June 1924, pp. 169–174, 10 figs.

RAILWAY MOTOR CARS

Development. Automotive Rail-Cars and Their Development. Soc. Automotive Engrs.—Jl., vol. 14, no. 6, June 1924. Contains following papers: The

Manufactured by Advertisers — CLASSIFIED LIST OF MECHANICAL EQUIPMENT — Alphabetical List on page 150

Steel, Cold Drawn
Union Drawn Steel Co.

Steel, Cold Rolled
Cumberland Steel Co.
Union Drawn Steel Co.

Steel, Hot Rolled
Central Steel Co.

Steel, Molybdenum
Central Steel Co.

Steel, Nickel
Central Steel Co.
Union Drawn Steel Co.

Steel, Open-Hearth
* Falk Corporation
Union Drawn Steel Co.

Steel, Rock Drill
* Ingersoll-Rand Co.

Steel, Screw, Cold Drawn
Union Drawn Steel Co.

Steel, Spring
Central Steel Co.

Steel, Strip (Cold Rolled)
Driver-Harris Co.

Steel, Tool
Cann & Saul Steel Co.

Steel, Vanadium
Central Steel Co.
Union Drawn Steel Co.

Steel Plate Construction
Bethlehem Shipbldg.Corp'n(Ltd.)
* Bigelow Co.
* Burhorn, Edwin Co.
* Casey-Hedges Co.
* Cole, R. D. Mfg. Co.
* Graver Corp'n
* Hendrick Mfg. Co.
* Keeler, E. Co.
Morrison Boiler Co.
Steere Engineering Co.
* Titusville Iron Works Co.
* Union Iron Works
* Vogt, Henry Machine Co.
* Walsh & Weidner Boiler Co.

Steps, Ladder & Stair (Non-Slipping)
* Irving Iron Works Co.

Stills
* Vogt, Henry Machine Co.

Stocks and Dies
* Landis Machine Co. (Inc.)

Stokers, Chain Grate
* Babcock & Wilcox Co.
* Combustion Engineering Corp'n
* Westinghouse Electric & Mfg. Co.

Stokers, Overfeed
* Detroit Stoker Co.
* Riley, Sanford Stoker Co.
* Westinghouse Electric & Mfg. Co.

Stokers, Traveling Grate, Anthracite
* United Machine & Mfg. Co.

Stokers, Underfeed
* American Engineering Co.
* Combustion Engineering Corp'n
* Detroit Stoker Co.
* Riley, Sanford Stoker Co.
* Sturtevant, B. F. Co.
* United Machine & Mfg. Co.
* Westinghouse Electric & Mfg. Co.

Strainers, Oil
* Bowser, S. F. & Co. (Inc.)
* Mason Regulator Co.

Strainers, Steam
* Foster Engineering Co.
* Kieley & Mueller (Inc.)
* Mason Regulator Co.

Strainers, Water
Elliott Co.
* Foster Engineering Co.
Golden-Anderson Valve Specialty Co.
* Kieley & Mueller (Inc.)
* Mason Regulator Co.
* Schutte & Koerting Co.

Strainers, Water (Traveling)
Link-Belt Co.

Structural Steel Work
* Hendrick Mfg. Co.
* Walsh & Weidner Boiler Co.

Sugar Machinery
Farrel Foundry & Machine Co.
* Walsh & Weidner Boiler Co.

Superheaters, Steam
* Babcock & Wilcox Co.
* Power Specialty Co.
* Superheater Co.

Superheaters, Steam (Locomotive)
* Power Specialty Co.
* Superheater Co.

Superheaters, Steam (Marine)
* Power Specialty Co.
* Superheater Co.

Switchboards
* General Electric Co.
* Westinghouse Electric & Mfg. Co.

Switches, Electric
* General Electric Co.
* Westinghouse Electric & Mfg. Co.

Synchronous Converters
(See Converters, Synchronous)

Tables, Drawing
Dietzgen, Eugene Co.
Economy Drawing Table & Mfg. Co.
Electro Sun Co. (Inc.)
Keuffel & Esser Co.
New York Blue Print Paper Co.
ParVell Laboratories
U. S. Blue Co.
Weber, F. Co. (Inc.)

Tachometers
* American Schaeffer & Budenberg Corp'n
* Bristol Co.
Veeder Mfg. Co.

Tachoscopes
* American Schaeffer & Budenberg Corp'n

Tanks, Acid
* Graver Corp'n
* Walsh & Weidner Boiler Co.

Tanks, Ice
* Frick Co. (Inc.)
* Graver Corp'n

Tanks, Oil
* Graver Corp'n
* Hendrick Mfg. Co.
Morrison Boiler Co.
* Scaife, Wm. B. & Sons Co.
* Titusville Iron Works Co.
* Walsh & Weidner Boiler Co.

Tanks, Pressure
* Graver, Corp'n
* Hendrick Mfg. Co.
* Ingersoll-Rand Co.
Morrison Boiler Co.
* Titusville Iron Works Co.
* Vogt, Henry Machine Co.
* Walsh & Weidner Boiler Co.

Tanks, Steel
Bethlehem Shipbldg.Corp'n(Ltd.)
* Bigelow Co.
* Casey-Hedges Co.
* Cole, R. D. Mfg. Co.
* Graver Corp'n
* Hendrick Mfg. Co.
Morrison Boiler Co.
* Scaife, Wm. B. & Sons Co.
* Titusville Iron Works Co.
* Union Iron Works
* Vogt, Henry Machine Co.
* Walsh & Weidner Boiler Co.

Tanks, Storage
* Cochrane Corp'n
* Cole, R. D. Mfg. Co.
* Combustion, Engineering Corp'n
* Graver Corp'n
* Hendrick Mfg. Co.
Morrison Boiler Co.
* Scaife, Wm. B. & Sons Co.
* Titusville Iron Works Co.
* Vogt, Henry Machine Co.
* Walsh & Weidner Boiler Co.

Tanks, Tower
* Graver Corp'n
* Walsh & Weidner Boiler Co.

Tanks, Welded
* Cole, R. D. Mfg. Co.
* Graver Corp'n
Morrison Boiler Co.
* Scaife, Wm. B. & Sons Co.

Tap Extensions
Allen Mfg. Co.

Tapping Attachments
* Whitney Mfg. Co.

Temperature Regulators
(See Regulators, Temperature)

Testing Laboratories, Cement
* Smidth, F. L. & Co.

Textile Machinery
* Franklin Machine Co.

Thermometers
* American Schaeffer & Budenberg Corp'n
* Ashton Valve Co.
* Bristol Co.
* Sarco Co. (Inc.)
* Tagliabue, C. J. Mfg. Co.
* Taylor Instrument Cos.

Thermometers, Chemical
* Tagliabue, C. J. Mfg. Co.

Thermometers, Distance
* Taylor Instrument Cos.

Thermometers, High Range (Recording)
* Bailey Meter Co.
* Tagliabue, C. J. Mfg. Co.
* Taylor Instrument Cos.

Thermometers, Industrial
* Tagliabue, C. J. Mfg. Co.

Thermostats
* Bristol Co.
* Fulton Co.
* General Electric Co.

Thread Cutting Tools
* Crane Co.
* Jones & Lamson Machine Co.
* Landis Machine Co. (Inc.)

Threading Machines, Pipe
* Landis Machine Co. (Inc.)

Tie Tamping Outfits
* Ingersoll-Rand Co.

Time Recorders
* Bristol Co.

Tinsmiths' Tools and Machines
* Niagara Machine & Tool Works

Tipples, Steel
Link-Belt Co.

Tools, Brass-Working Machine
* Warner & Swasey Co.

Tools, Machinist's Small
* Atlas Ball Co.

Tools, Pneumatic
* Ingersoll-Rand Co.

Tracks, Industrial Railway
Easton Car & Construction Co.

Tracks, Overhead
Palmer-Bee Co.

Tractors
* Allis-Chalmers Mfg. Co.

Tractors, Industrial (Storage Battery)
* Yale & Towne Mfg. Co.

Tractors, Turntable
* Whiting Corp'n

Trailers, Industrial
* Yale & Towne Mfg. Co

Tramrail Systems, Overhead
* Brown Hoisting Machinery Co.
Link-Belt Co.
* Whiting Corp'n

Tramways, Bridge
Link-Belt Co.

Tramways, Wire Rope
Clyde Iron Works Sales Co.
Lidgerwood Mfg. Co.
* Roebling's, John A. Sons Co.

Transfer Tables
* Whiting Corp'n

Transformers, Electric
* Allis-Chalmers Mfg. Co.
* General Electric Co.
* Westinghouse Electric & Mfg. Co.

Transmission Machinery
(See Power Transmission Machinery)

Transmissions, Automobile
* Foote Bros. Gear & Machine Co.

Transmissions, Variable Speed
* American Fluid Motors Co.
* Foote Bros. Gear & Machine Co.

Traps, Radiator
* American Radiator Co.
* Sarco Co. (Inc.)

Traps, Return
* American Blower Co.
* Crane Co.
* Kieley & Mueller (Inc.)

Traps, Steam
* American Blower Co.
* American Schaeffer & Budenberg Corp'n
* Crane Co.
Elliott Co.
Golden-Anderson Valve Specialty Co.
* Jenkins Bros.
Johns-Manville (Inc.)
* Kieley & Mueller (Inc.)
* Reading Steel Casting Co. (Inc.)
(Pratt & Cady Division)
* Sarco Co. (Inc.)
* Schutte & Koerting Co.
Squires, C. E. Co.
* Vogt, Henry Machine Co.

Traps, Vacuum
* American Blower Co.
* American Schaeffer & Budenberg Corp'n
* Crane Co.
* Sarco Co. (Inc.)

Treads
* Irving Iron Works Co.

Treads, Stair (Rubber)
* United States Rubber Co.

Trolleys
* Brown Hoisting Machinery Co.
* Whiting Corp'n

Trolleys, Monorail
Palmer-Bee Co.

Trucks, Industrial (Storage Battery)
* Yale & Towne Mfg. Co.

Trucks, Trailer
* Yale & Towne Mfg. Co.

Tubes, Boiler, Seamless Steel
* Casey-Hedges Co.

Tubes, Condenser
* Scovill Mfg. Co.
* Wheeler Condenser & Engrg. Co.

Tubes, Pitot
* American Blower Co.
Bacharach Industrial Instrument Co.

Tubing, Rubber
* Goodrich, B. F. Rubber Co.
* United States Rubber Co.

Tubing, Rubber (Hard)
* Goodrich, B. F. Rubber Co.

Tumbling Barrels
Farrel Foundry & Machine Co.
* Royersford Fdry. & Mach. Co.
* Whiting Corp'n

Turbines, Hydraulic
* Allis-Chalmers Mfg. Co.
* Cramp, Wm. & Sons Ship & Engine Bldg. Co.
Hoppes Water Wheel Co.
* Leffel, James & Co.
Newport News Shipbuilding & Dry Dock Co.
Smith, S. Morgan Co.
* Worthington Pump & Mchry. Corp'n

Turbines, Steam
* Allis-Chalmers Mfg. Co.
* Coppus Engineering Corp'n
* De Laval Steam Turbine Co.
* General Electric Co.
* Kerr Turbine Co.
Ridgway Dynamo & Engine Co.
* Sturtevant, B. F. Co.
* Terry Steam Turbine Co.
* Westinghouse Elec. & Mfg. Co.
* Wheeler Condenser & Engrg. Co.

Turbo-Blowers
* Coppus Engineering Corp'n
* General Electric Co.
* Ingersoll-Rand Co.
* Kerr Turbine Co.
* Sturtevant, B. F. Co.

Turbo-Compressors
* Ingersoll-Rand Co.

Turbo-Generators
* Allis-Chalmers Mfg. Co.
* De Laval Steam Turbine Co.
* General Electric Co.
* Kerr Turbine Co.
Ridgway Dynamo & Engine Co.
* Sturtevant, B. F. Co.
* Terry Steam Turbine Co.
* Westinghouse Electric & Mfg. Co.

Turbo-Pumps
Bethlehem Shipbldg. Corp'n (Ltd)
* Coppus Engineering Corp'n
* Kerr Turbine Co.
* Terry Steam Turbine Co.
* Wheeler Condenser & Engineering Co.

Turntables
Easton Car & Construction Co.
Link-Belt Co.
Palmer-Bee Co.
* Whiting Corp'n

Turret Machines
(See Lathes, Turret)

Unions
* Crane Co.
* Edward Valve & Mfg. Co.
Lunkenheimer Co.
* Pittsburgh Valve, Fdry. & Const. Co.
* Vogt, Henry Machine Co.

Unions, Pressed Steel
Rockwood Sprinkler Co.

Unloaders, Air Compressor
* Ingersoll-Rand Co.
* Worthington Pump & Machinery Corp'n

Unloaders, Ballast
Lidgerwood Mfg. Co.

Unloaders, Car
* Gifford-Wood Co.
Link-Belt Co.

Vacuum Breakers
* Foster Engineering Co.

Vacuum Dryers, Pans, Pumps, Traps, etc.
(See Pans, Pumps, Traps, etc., Vacuum)

Valve Discs
* Edward Valve & Mfg. Co.
Garlock Packing Co.
* Goodrich, B. F. Rubber Co.

*Catalogue data of firms marked * appear in the A.S.M.E. Condensed Catalogues of Mechanical Equipment, 1923-24 Volume*

Modern Motor Rail-Car, M. L. McGrew, pp. 649–656, 4 figs.; Motorized Railroad Equipment, E. J. Brennan, pp. 656–659, 2 figs.; Motorization of "Light-Service" Rail-Transportation, E. Wanamaker, pp. 659–662.

Gasoline. New Swedish Rail Cars (Neue Autotriebwagen für Schweden), Breuer. Glasers Annalen, vol. 94, no. 10, May 15, 1924, pp. 133–134, 2 figs. One-man cars for operation on Swedish railways, built in Germany, equipped with Buessing gasoline motors and Jaeger roller bearings, and heated by exhaust gases.

Motorized Passenger Coach. Gasoline Motorized Coach Minnesota Dakota & Western Ry. Ry. Rev., vol. 74, no. 21, May 24, 1924, pp. 934–935, 3 figs. Gasoline motor power equipment which may be applied to existing passenger coaches accomplishing their conversion to efficient type of motor car.

Narrow-Gage. Internal-Combustion Rail Coach for the Barbados Government Railway. Ry. Gaz., vol. 40, no. 22, May 30, 1924, pp. 774–776, 4 figs. New design for narrow-gage traffic on lines having steep gradients; built by Drury Car Co.

RAILWAY OPERATION

Great Western Ry. The Bristol Division of the Great Western Railway. Ry. Gaz., vol. 40, no. 21, May 23, 1924, pp. 739–734, 4 figs. Describes Great West. Ry. traffic methods and equipment of Bristol Division.

Train Control. Hearing on Automatic Train Control at Washington. Ry. Rev., vol. 74, nos. 20 and 21, May 17 and 24, 1924, pp. 888–889 and 893–986, and 927–929 and 933–934. Testimony of railroad, signal engineers and representatives of manufacturers before Interstate Commerce Commission. See also Ry. Age, vol. 76, no. 25, May 24, 1924, pp. 1255–1258.

New Design of Brookins Train Control. Ry. Signaling, vol. 17, no. 6, June 1924, pp. 247–249, 7 figs. Features normally raised descending-type show and flexible brush contact.

Train Despatching. Recent Developments in Telephone Train Dispatching Circuits, Wm. H. Capen. Ry. Signaling, vol. 17, no. 6, June 1924, pp. 253–256, 15 figs. Line-transmission equipment, train-despatching circuits and location of apparatus. (Abstract.) Paper presented before Telegraph and Telephone Section, Am. Ry. Assn.

The "Dispatching System" by Telephone on the Belgian State Railways, H. De Caesstecker. Int. Ry. Congress Assn.—Bul., vol. 6, no. 5, May 1924, pp. 331-395, 20 figs. New method of controlling running and composition of trains. Lines on which "dispatching system" is already in operation or on which its adoption has been decided upon or is under consideration; administrative organization of system; choice of staff; financial results.

RAILWAY REPAIR SHOPS

Car Repairs. A Construction Study of Railroad Car Repairs. Ry. Rev., vol. 74, no. 23, June 7, 1924, pp. 989–999, 14 figs. Results of extended investigation of actual facilities with view to suggestions for introduction of economies and elimination of losses.

Machine Tools and Methods. Southern Pacific Repairs, H. Campbell. Am. Mach., vol. 60, no. 24, June 12, 1924, pp. 869–872, 14 figs. Saving time and work by use of air cylinders; ball-bearing roller tools; friction chuck for taps and reamers; turning lift shafts; and other tools employed in repair shop at Houston, Tex.

Santa Fe Ry., Albuquerque, N. M. Improved Shop Operation of Albuquerque, N. M. Ry. Mech. Engr., vol. 98, no. 6, June 1924, pp. 333–342, 12 figs. New Santa Fe shops repaired 302 locomotives in 1923; marked reduction in man-hours per engine.

Southern Pacific Lines. Southern Pacific Lines Extending Repair Facilities. Ry. Rev., vol. 74, no. 20, May 17, 1924, pp. 881–884, 6 figs. Building program; extensions to El Paso, San Antonio and Houston shops, together with complete oil fuel-handling plant at El Paso, modern engine terminal at Lafayette, and replacement of coach paint shop at Houston.

Street-Car. Shop and Storage for Eighth Avenue Road. Elec. Ry. Jl., vol. 63, no. 22, May 31, 1924, pp. 849–852, 7 figs. New York City line rebuilds old foundry for repair and inspection shops, at 155th Street and Eighth Ave.; storage yard for cars is without special trackwork on account of expensive conduit construction; transfer tables used as substitute; new type of slot-track construction.

RAILWAY SHOPS

Locomotive. Locomotive Boiler Work in a Modern British Shop. Eng. Production, vol. 7, no. 140, May 1924, pp. 142–143, 5 figs. Notes on equipment and methods employed at Elswick Works of W. G. Armstrong, Whitworth & Co., Ltd., at Newcastle-on-Tyne.

RAILWAY SIGNALING

Automatic Block. Engineering and Installation of Automatic Block Signals, L. R. Stahl. Ry. Signaling, vol. 17, no. 6, June 1924, pp. 242–243. Method of selling signaling to operating men; estimating and securing authority for installation; detail plans and construction program.

Brake-Distance Calculation. Calculating Brake Distance by Chart, C. A. Melhuish. Ry. Signaling, vol. 17, no. 5, May 1924, pp. 204–205, 2 figs. Chart for establishing overlap distances devised according to formulas.

Colored-Light Signals. New Signals on Burlington Expedite Traffic. Ry. Age, vol. 76, no. 25, May 24, 1924, pp. 1260–1262, 3 figs. Delays reduced from 15 min. to hour by replacing positive block with automatics; color-light automatic signal installation placed in service between Guernsey, Wyo., and Wendover.

Increasing Track Capacity. How Signals Increase Track Capacity. Ry. Signaling, vol. 17, no. 5, May 1924, pp. 198–200. Contest papers, sponsored by this journal, as follows: Increasing Track Capacity by Signaling, Geo. S. Pflasterer; Automatics Help on the I. C., C. W. Shaw; Signaling Delays Double Track on Branch of Pennsylvania, L. L. Banks; Signaling Postposed Heavier Expenditures on N. & W., R. H. Smith; Cash Saving Accomplished by Signals on the B. & O., J. C. Hoffman.

Interlocking. New Plant on the Pennsylvania, F. A. Beck. Ry. Signaling, vol. 17, no. 5, May 1924, pp. 191–194, 8 figs. Installation of low-pressure electropneumatic interlocking at Aspinwall, Pa., replaces three old mechanical plants at saving of $36,690 per yr.

Single-Track. Single Track Signaling on C. B. & Q. Ry. Signaling, vol. 17, no. 6, June 1924, pp. 230–233, 9 figs. Delco generator used as power source for a.c. floating system; unique control for tunnel protection.

Track Circuiting. Maintenance of D. C. Track Circuits, R. J. Cox. Ry. Signaling, vol. 17, no. 5, May 1924, pp. 205–206. Track-circuit troubles and their causes; bonding and track connection as cause of trouble.

RAILWAY SWITCHES

Automatic Block. The Switches of Automatic Section-Block Installations (Die Schaltungen der selbsttätigen Streckenblockanlagen), Arndt. Siemens-Zeit., vol. 4, nos. 3 and 4–5, Mar. and Apr.-May 1924, pp. 89–93 and 108–112, 14 figs. Describes system of Siemens & Halske.

Spring. Spring Switches Reduce Delays on Santa Fe, D. K. Crawford. Ry. Age, vol. 76, no. 26, May 31, 1924, pp. 1313–1314, 3 figs. Installations at ends of passing tracks and yard outlets under signal protection prevent train stops. See also Ry. Eng. & Maintenance, vol. 20, no. 6, June 1924, pp. 222–223, 3 figs.

Use Spring Switches to Eliminate Interlockers on Santa Fe, D. K. Crawford. Ry. Signaling, vol. 17, no. 6, June 1924, pp. 244–245, 5 figs. Novel method of operating yard and siding turnouts, and savings produced.

RAILWAY TIES

Tests. Tests of Substitute Ties. Eng. & Contracting (Railways), vol. 61, no. 5, May 21, 1924, pp. 1123–1129, 8 figs. Reports from railways making tests, submitted at annual convention of Am. Ry. Eng. Assn., as Appendix A of report of Committee on Ties.

Treating Plant. New Tie-Treating Plant on the Oregon-Washington R. R. Eng. News-Rec., vol. 92, no. 21, May 22, 1924, pp. 894–896, 6 figs. Four retorts for zinc-chloride process; long narrow tie storage yard served by hammer-head gantry crane; methods of treatment.

REFRIGERATING PLANTS

Tests. Additional Data Regarding the Reliability of Fluid Meters in Refrigerating Tests, L. S. Morse. Refrig. Eng., vol. 10, no. 11, May 1924, pp. 385–398 and (discussion) 398–404, 12 figs. Results of comparisons and calculations of orifice, brine venturi, water venturi, and ammonia venturi meters.

REFRIGERATION

Meat and Fish. New Investigations on the Preservation of Meat and Fish by the Freezing Process. Ice & Cold Storage, vol. 27, no. 314, May 1924, pp. 114–116, 8 figs. Changes on tissue of interior organs, heart, liver, kidneys, and spleen that result from freezing process. From article by E. Kallert in Zeit. für die Gesamte Kälte Industrie.

REGULATORS

Arca. Arca Regulators at the British Empire Exhibition. Engineering, vol. 117, no. 3048, May 30, 1924, pp. 714–716, 7 figs. Recent applications of system and improved forms of components lately introduced and shown by firm at Exhibition.

RESEARCH

Industrial, Utilization of Statistics in. The Utilization of Statistics, A New and Valuable Aid in Industrial Research and in the Evaluation of Test Data, K. H. Daeves. Testing, vol. 1, no. 3, Mar. 1924, pp. 173–189, 11 figs. Attempt is made to apply results of experience to industrial research; demonstration is given, by a number of examples, of how new "large figure research" may be applied to plant operation, to testing of materials, and control of services rendered, and how important conclusions may be drawn from the very simple application of method; relation is established in which this statistical research stands to pure science, its value to industrial research and operating engineer is demonstrated, and other fields of application are intimated.

RIVETED JOINTS

Slip in Single and Repetitive Loading. Slip of Riveted Joints in Single and Repetitive Loading, D. H. Blakelock. Eng. News-Rec., vol. 92, no. 23, June 5, 1924, pp. 972–973, 3 figs. Results of 70 tests carried out at Cornell University on butt joints indicate first slip at average rivet shear of 5900 lb. per sq. in.

RIVETING

Machines. Hydraulically Compressed Boiler Riveting (Hydraulisch gepresste Kesselnietung). Schiffbau, vol. 25, no. 12, Mar. 26, 1924, pp. 310–312, 6 figs. Describes stationary and portable types of hydraulic riveting machines and their operation.

ROLLING MILLS

Atlantic Steel Co., Atlanta, Ga. A Southern Rolling Mill, M. P. Lawton. Blast Furnace & Steel Plant, vol. 12, no. 6, June 1924, pp. 291–294 and 305, 9 figs. Equipment and methods of Atlantic Steel Co.'s plant, Atlanta, for manufacture of hoop and cotton ties.

Sheet Mills. Sheet Steel Plant on Pacific Coast. Iron Age, vol. 113, no. 23, June 5, 1924, pp. 1650–1652, 5 figs. Six-mill installation put in operation by Pac. Sheet Corp. at South San Francisco, Cal.; blue annealed, black and galvanized sheets to suit local market.

ROLLS

Grinding. How Chilled Iron Rolls are Ground. Abrasive Industry, vol. 5, no. 5, May 1924, pp. 119–122, 5 figs. Special machines are provided for finishing steel-mill rolls. Value of grinding over turning.

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SCREW MACHINES

Magazine Attachments. Design of Magazine Attachments, A. A. Dowd. Machy. (N. Y.), vol. 30, no. 10, June 1924, pp. 771–773, 4 figs. Problems of design; details of bar-stock magazine.

SEAPLANES

Metal. The L. F. G.-V20a Commercial Airplane (Das Verkehrsflugzeug "L.F.G.-V20a"), R. Roseph. Motorwagen, vol. 27, no. 13, May 10, 1924, pp. 223–224, 3 figs. Improved type of metal seaplane with empty weight of 1150 kg.

SEPARATORS

Ash and Fuel. A New Fuel-Recovery Plant (Ash Washer) [Ein neuer Brennstoffrückgewinner (Schlackenwäscher)], H. Kiesel. Gas- u. Wasserfach, vol. 67, no. 12, Mar. 22, 1924, pp. 153–154, 2 figs. New type of ash separator, known as eukonomator, employed at gas works in Heilbronn, Germany, which has not heretofore been described.

Recovering Unburned Fuel and Other Matter from Ash, C. H. S. Tupholme. Gas Age-Rec., vol. 53, no. 20, May 17, 1924, pp. 679–682, 7 figs. Description of British apparatus employed for this purpose with results of operation; a type of washer, known as the Columbus, which is actuated by difference in specific gravity between coke and clinker.

SHEET METAL

Standardization. Standardization of Sheet Metal L. D. Mercer. Sheet Metal Worker, vol. 15, no. 9, May 23, 1924, pp. 327–328 and 350. Facts about waste in this industry, with recommendations on its elimination and on expansion of business.

SPECIFIC HEAT

Liquid and Its Vapor. The Difference of the Specific Heats, at Constant Volume, of a Liquid and Its Vapor (Ueber die Differenz der spezifischen Wärmen, bei konstantem Volumen, einer Flüssigkeit und ihres Dampfes), A. Brandt. Annalen der Physik, vol. 73, no. 5–6, Feb. 1924, pp. 412–414. Shows that specific heat at constant volume consists of two quantities: (*a*) constant specific heat; (*b*) varying quantity of heat which on raising temperature 1 deg. cent. is used up in dissociation.

STEAM ENGINES

Admission and Exhaust in. The Zeuner Valve Diagram, H. Smith. Pacific Mar. Rev., vol. 21, no. 5, May 1924, pp. 269–270, 1 fig. Practical use and solution of Zeuner diagram, a method by which a study of the various conditions governing admission and exhaust of steam can be made, in order to obtain a more thorough knowledge of events which take place inside cylinder. Relation to valve positions and indicator diagram.

Rolling Mills. British Rolling Mill Engine Design, Johnstone-Taylor. Iron Age, vol. 113, no. 24, June 12, 1924, pp. 1717–1719, 5 figs. Large and massive engines of marine type with special features; both horizontal and vertical 3-cylinder designs.

STEAM GENERATORS

Benson High-Pressure. The Scientific Principles of the Benson High Pressure Steam Generator, D. Brownlie. Eng. & Boiler House Rev., vol. 37, no. 10, May 1924, pp. 358–360, 2 figs.

STEAM PIPES

Calculation. Calculation of Steam Piping (Berechnung von Dampfleitungen), Praktische Maschinen-Konstrukteur, vol. 57, no. 10, Mar. 25, 1924, pp. 118–121, 6 figs. Method for determination of pressure and heat losses in steam pipes.

High-Pressure. Progress in High Pressure Piping Details. Power Plant Eng., vol. 28, no. 12, June 15, 1924, pp. 656–657. Recent tests show effects of expansion stresses in pipe; progress being made in flange-bolt materials and design. (Abstract.) Report of Prime Movers Committee of N.E.L.A.

STEAM POWER PLANTS

Bonus Systems for. Practical Bonus Systems for Power Plants, G. Burgess. Nat. Engr., vol. 28, no. 6, June 1924, pp. 255–258, 4 figs. Outline of bonus system methods for average power plant. Value of a bonus system in increasing interest of operators and efficiency of plant.

British and American Practice. Power Station Practice and Progress, W. H. Patchell. Power Plant Eng., vol. 28, no. 11, June 1, 1924, pp. 611–612. Comparison of British and American practice (Abstract.) Address before (Brit.) Inst. Mech. Engrs.

Modern Economical Developments. The Influence of Modern Thermotechnical Development on Power-Plant Design (Der Einfluss der neueren wärmetechnischen Entwicklung auf den Kraftwerksbau), F. Ohlmüller. Elektrotechnische Zeit., vol. 45, no. 17, Apr. 24, 1924, pp. 385–389, 9 figs. It is shown

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that modern furnace types permit development of larger boiler units, and larger boilers permit savings in cost of installation; position and arrangement of economizer has great bearing on design and costs of boiler houses; the Benson process; design and advantages of multi-cylinder Brünner-type turbines.

Oil Refinery. Vacuum Oil Co. Plant at Paulsboro, N. J. Power Plant Eng., vol. 28, no. 12, June 15, 1924, pp. 31–636, 9 figs. All electric power used in refining processes is generated at plant by turbo-generators at potential of 2300 volts; all turbines operate non-condensing against back pressure of about 20 lb.; details of boiler room and furnace design.

Wood-Refuse Burnin . New Plant of American Seating Co. Burns Wood Refuse. Power, vol. 59, no. 23, June 3, 1924, pp. 892–897, 8 figs. Model 1500-kw. industrial plant employi g condensing turbo-generat -s with bleeder connections to balance exhaust-steam demands; high-pressure steam supplied to manufacturing departments.

STEAM TURBINES

Assembling Runners. Assembling 15,000-Horse-power Impulse-Turbine Runners, Ralph Brown. Power, vol. 59, no. 22, May 27, 1924, pp. 867–868, 3 figs. Methods employed in assembling rotor spiders for 22,222-kva. generator.

Developments. Developments in Steam-Turbine Field, E. H. Brown. Power, vol. 59, no. 25, June 17, 1924, pp. 989–992, 2 figs. Steam turbine from its inception in 1884, with particular reference to recent developments in American and European practice, such as general application of stage heating, use of high pressures with resuperheating, and improvements designed to give high efficiency at moderate peripheral velocities for rotating parts. Paper presented at Wis. Utilities Assn.

Mixed-Pressure. Mixed-Pressure Turbine versus a New Steam Plant, F. S. Yontsey. Power, vol. 59, no. 24, June 10, 1924, pp. 934–936, 3 figs. To supply power to new mine 4½ mi. distance, mixed-pressure turbine in home plant was selected over steam plant at new mine or additional high-pressure capacity in original plant; salient features are condenser and cooling-water installations.

STEEL

Alloy. See ALLOY STEELS.

Identification by Grindstone Sparks. Differentiation of Steels by Examination of the Grindstone Sparks in Air and in Oxygen (Différenciation des aciers par l'examen des étincelles de meulage dans l'air et dans l'oxygène), E. Pitois. Académie des Sciences—Comptes Rendus, vol. 178, no. 11, Mar. 10, 1924, pp. 942–944. By placing sheet of glass in path of sparks and examining incrustations so obtained, it is found that, in air, most of particles obtained by grinding from ordinary steels undergo fusion; these incrustations are not wholly pearlitic, but exhibit wide regions of ferrite resulting from decarburization, latter becoming complete in atmosphere of oxygen; photographic representations of sparks were obtained; this method of examination is of special value for valve steels.

Structural. See STRUCTURAL STEEL.

STEEL CASTINGS

Design. Designing Steel Castings, E. R. Young. Machy. (N. Y.), vol. 30, nos. 9 and 10, May and June 1924, pp. 701–703 and 790–792, 8 figs. Problems encountered in production. May: Pattern design; effect of dry sand and green sand molds on shrinkage; cores; rip design; size and shape of castings; chemical composition; finish allowances. June: Engineering or structural design; castings of intricate design; fatigue strength of castings.

Manufacture. The Manufacture of American Steel Castings, W. H. Woodhall. Foundry Trade Jl. vol. 29, no. 404, pp. 399–401. Molding methods, acid or basic melting, physical properties and tests, dirty versus clean steel, sampling, cleaning and inspection, annealing furnaces, annealing period, etc.

STEEL, HEAT TREATMENT OF

Carburizing. Practical Views on Carburizing, J. Sorenson. Fuels & Furnaces, vol. 2, no. 6, June 1924, pp. 583–584 and 587–588, 2 figs. Outlines the various thermal treatments in carburizing and results to be secured with each.

Production Methods. Heat-treatment of Steel with Special Reference to Production, J. W. Urquhart. Machy. (Lond.), vol. 24, no. 608, May 22, 1924, pp. 230–233. Locomotive and car-axle treatments; mild treatment; production of unequal stresses; importance of reduction forging and steel selection for this work; quenching media; dynamic endurance and tensile strength; quenching of coreless pieces.

STEEL MANUFACTURE

Austria. Böhler Steel, H. Obermeyer and A. L. Greene. Blast Furnace & Steel Plant, vol. 12, no. 6, June 1924, pp. 281–284, 4 figs. Practice and equipment of the steel works of Böhler Bros. & Co. in Austria.

Ordnance Steel. Making Steel for Ordnance Use, J. B. Rhodes. Iron Trade Rev., vol. 74, no. 22, May 29, 1924, pp. 1429–1430 and 1433. Points out that reduction of iron oxide to minimum is essential; sulphur and phosphorus should be eliminated; steel quality affected by slag; shop-practice instructions are suggested. (Abstract.) Paper presented before Am. Iron & Steel Inst.

Processes. The Manufacture of Iron and Steel and Tubular Products, R. J. Kaylor. St. Louis Ry. Club—Proc., vol. 28, no. 12, Apr. 11, 1924, pp. 258–273. Describes some of the major processes connected with manufacture of steel of various kinds.

STEEL WORKS

Developments. A Gigantic Automaton, A. R. R. Jones. Iron & Steel of Canada, vol. 7, nos. 4 and 6. Apr. and June 1924, pp. 61–65 and 99–103, 12 figs. Part that mechanism is playing in steel industry, and amelioration that has lately taken place in working conditions.

STOKERS

Efficiency, Calculation of. Computing Guaranteed Stoker Efficiency, H. F. Gauss. Power, vol. 59, no. 22, May 27, 1924, pp. 858–860, 3 figs. Deals with unaccountable losses, moisture in coal, available hydrogen content and combustible matter in ash.

Water-Tube and Cylindrical Boilers. Mechanical Stokers and Boiler Furnaces. Eng. & Boiler House Rev., vol. 37, no. 11, June 1924, 18 pp. between pp. 397–422, 19 figs. Notes on present-day practice describing some leading types in use for water-tube and cylindrical boilers.

STRESSES

Shearing, on Flat Elastic Strips. On the Stability under Shearing Forces of a Flat Elastic Strip, R. V. Southwell and S. W. Skan. Royal Soc.—Proc. vol. 105, no. A 733, May 1, 1924, pp. 582–607, 6 figs. Investigation relating to a flat elastic strip, of uniform breadth, thickness and material, upon which a uniform shear is imposed by tangential tractions applied at its edges and in its plane.

STRUCTURAL STEEL

Beauty in Structures. The Beauty of the Forms of Iron and Steel Structures, Gruetz. Eng. Progress, vol. 5, no. 5, May 1924, pp. 96–99, 10 figs. Gives examples of designs produced by Maschinenfabrik Augsburg-Nürnberg (MAN), Gustavsburg Works, showing how interesting and beautiful forms may result, even when using such stubborn material as iron, if engineer and architect collaborate harmoniously.

SUPERPOWER

Interconnection and. Superpower and Interconnection, Herbert Hoover. Elec. World, vol. 83, no. 21, May 24, 1924, pp. 1078–1080. Points out that economical expansion is possible in these twin developments and shows necessity of keeping initiative free from deadening influence both of bureaucracy and of socialistic experiment. (Abstract.) Address before Nat. Elec. Light Assn.

T

TERMINALS, LOCOMOTIVE

Turntables. Types of Turntable Developed for Heavier Locomotives. Eng. News-Rec., vol. 92, no. 23, June 5, 1924, pp. 964–967, 6 figs. Continuous and 2-span tables replace cantilever type; larger and heavier locomotives introduce problems not present with light power; lower maintenance cost and quicker operation.

TEXTILE MACHINERY

Gas-Fired Hot-Air Furnace for. Hot-Air Furnaces with Gas Firing (Heissluftofen mit Gasfeuerung), Riemer. Gas- u. Wasserfach, vol. 67, no. 14, Apr. 5, 1924, pp. 182–184, 3 figs. Describes gas-fired hot-air furnace for heating of textile machines; results of preliminary tests; economy and efficiency.

TEXTILES

Fibers, Elasticity of. An Investigation of the Nature of the Elasticity of Fibres, S. A. Shorter. Textile Inst.—Jl., vol. 15, no. 4, Apr. 1924, pp. T207–T229, 14 figs. Experimental investigation of fiber elasticity. Formulates theory of fiber elasticity, basis of which is a dynamical model, which imitates behavior of a fiber. Properties of actual fibers studied in light of this theory. Relation between behavior of fibers and that of yarns. Possible future development of work.

Yarns. Wearing Tests for Yarns and Some Observations on Reeds, G. F. New. Textile Inst.—Jl., vol. 15, no. 4, Apr. 1924, pp. T230–T236, 13 figs. Describes instruments developed with a view of obtaining by their means, both easily and quickly, knowledge of probable behavior of any particular yarn or dressing under working conditions.

TIRES, RUBBER

Manufacturing Costs. Tire Factory Manufacturing Costs, J. J. Dawson. India Rubber Wld., vol. 70, nos. 1, 2 and 3, Apr. 1, May 1 and June 1, 1924, pp. 436–438, 503–505 and 576–578, 8 figs. Continuous process system; purchases and material accounts; purchase register and material ledger; payroll and payroll analysis; production reports.

TOOLS

Cutting Trials. Tool-Steel and Cutting Trials, D. Smith and I. Hey. Mech. Wld., vol. 75, nos. 1947 and 1948, Apr. 25 and May 2, 1924, pp. 255–258 and 272–274, 9 figs. Investigation of behavior of tools when taking extremely find cuts over a wide range of speeds and quality and treatment of tool steel most suitable for use under such conditions. Report of Lathe Tool Research Committee.

Locating Holes in Angular Face. Tool-room Formulae for Locating Holes in Work with Angular Faces. Machy. (Lond.), vol. 24, no. 607, May 15, 1924, pp. 201–203, 4 figs. Formulas developed for use of toolmaker when work requires accurate location of hole in angular face.

TRACTORS

Caterpillar. The M.T.W. Caterpillar Tractors (Der "M.T.W."-Raupenschlepper). Wirtschaftsmotor, vol. 6, no. 3, Mar. 25, 1924, pp. 7–8, 3 figs. Type of small tractor developed by firm of Poehl, Berlin, Germany.

Farm. Farm Tractors (Landwirtschaftliche Traktoren), L. von Münchow. Automobil-Rundschau, vol. 23, no. 5, May 1924, pp. 55–56, 5 figs. German types.

TRAFFIC

Control. Traffic Control by Wireless, R. Twelvetrees. Motor Transport (Lond.), vol. 38, no. 1006, June 9, 1924, pp. 714–716, 6 figs. How London Metropolitan Police Force engineers controlled flow of vehicles to and from Epsom on Derby Day. Explains general scheme and gives details of vehicles used as wireless tenders.

TUBES

Copper, Manufacture of. Manufacture of Brass and Copper Sheets and Seamless Drawn Tubes, A. Spittle. Metal Industry (Lond.), vol. 24, nos. 16, 17 and 18, Apr. 18, 25 and May 2, 1924, pp. 375–376, 399–402 and 427–430, 13 figs. In its broad outlines deals with methods common to the trade in general, and in detail with procedure practiced at a particular works. From paper before Bradford Eng. Soc.

V

VAPORS

Pressures. Graphical Vapor Pressure and Specific Gravity Tables, H. G. Deming. Indus. & Eng. Chem., vol. 16, no. 6, June 1924, pp. 614–615, 3 figs. Tables present information commonly given in 40 or 50 pages of print in very much condensed form, and offer advantage of instant visual interpolation between values given in ordinary tables.

VENTILATION

Air-Duct Calculations. Cold Air Ventilating Ducts, H. J. Macintire. Southern Engr., vol. 41, no. 3, May 1924, pp. 47–49, 3 figs. Determining friction heat due to flow of air in ducts, and methods of designing air-duct systems.

Department Stores. Problems in Ventilation of Department Stores, A. M. Feldman. Am. Soc. Heat. & Vent. Engrs.—Jl., vol. 30, no. 1, Jan. 1924, pp. 24–28, 2 figs. System designed by author for ventilating ground floor of a large department store so as not only to provide an ample supply of fresh air large enough for an unlimited number of customers and sales force but also to eliminate all danger of drafts.

W

WAGES

Incentive Systems. Installing Wage Incentive Systems that Work, E. Beck. Factory, vol. 32, no. 6, June 1924, pp. 826–829, 940, 941, 942 and 943, 4 figs. Describes system installed 10 years ago in an Indianapolis pharmaceutical plant which, it is claimed, has raised hourly wage of employees, reduced unit cost in factory, and materially bettered working conditions in laboratories.

WASTE HEAT

Utilization. Heat Utilization in the Sugar Refinery at Nestomitz (Die Energiewirtschaft in der Nestomitzer Zuckerraffinerie A.-G.), Niethammer. Archiv für Wärmewirtschaft, vol. 5, no. 5, May 1924, pp. 81–84, 6 figs. Installation of a new steam turbine has made it possible to utilize energy of superheated steam and to cover nearly one-quarter of requirements of a big system of power distribution.

The Utilization of Exhaust Steam (A propos de l'utilisation de la vapeur d'échappement), F. D'Espine. Chaleur & Industrie, vol. 5, no. 46, Feb. 1924, pp. 53–61, 8 figs. Calls attention to fuel economy which can be effected by rational utilization of waste heat, and gives numerical values showing profits which can be realized by installations for this purpose; examples of waste-heat installations.

WELDING

Chemical Aspects. Some Chemical Aspects of Welding, J. R. Booer. Welding Engr., vol. 9, nos. 4 and 5, Apr. and May 1924, pp. 29, 44 and 46; and 29 and 32–33. Notes on physical phenomena; principles of oxidation and reduction. Paper read before Instn. Welding Engrs. See also Acetylene Jl., vol. 25, nos. 10 and 11, Apr. and May 1924, pp. 487–488 and 492–494, and 537–539.

Electric. See ELECTRIC WELDING; ELECTRIC WELDING, ARC.

Fluxes and Slags in. Fluxes and Slags in Welding, W. Spraragen. Foundry Trade Jl., vol. 29, no. 405, May 22, 1924, pp. 414–416. Deals with fluxes in electric-arc and gas welding, and welding of monel metal and cast iron. Abridged from paper read at symposium arranged by Faraday Soc., Inst. Metals, Inst. British Foundrymen, and Non-Ferrous Research Assn.

Oxy-Acetylene. See OXY-ACETYLENE WELDING.

WIND TUNNELS

Resistance of Spheres. The Resistance of Spheres in Wind Tunnels and in Air, D. L. Bacon and E. G. Reid. Nat. Advisory Committee for Aeronautics—Report, no. 185, 1924, 21 pp., 18 figs. Satisfactory confirmation of Reynolds law has been accomplished, effect of means of support determined, range of experiment greatly extended by work in new variable-density tunnel, and effects of turbulence investigated by work in tunnels and by towing and dropping tests in free air.

Alphabetical List of Advertisers

See Pages 132-150 for Classified List of Mechanical Equipment

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(See also page 574 of this issue for supplementary items.)

AERONAUTICAL INSTRUMENTS

Rate-of-Climb Recorders. Optical Rate-of-Climb Recorders—Their Uses, Theory, and Description, A. H. Mears and D. H. Strother. Optical Soc. of Am.—Jl., vol. 8, no. 6, June 1924, pp. 787–801, 7 figs. Describes instruments developed by staff of Bur. Standards at request and with financial assistance of Air Service, U. S. Army, and Bur. Aeronautics, U. S. Navy.

AIRCRAFT CONSTRUCTION MATERIALS

Three-Ply. Three-Ply and Its Uses in Aircraft Construction, R. N. Liptrot. Instn. Aeronautical Engrs., Min. of Proc. No. 8, 1923, pp. 7–17 and (discussion) 18–22. Discusses physical properties of plywood; shrinkage and prevention of warping; effect of number of piles; figures for use in design; method of manufacture; true monocoque fuselage, semi-monocoque type, and three-ply braced fuselages. Abstract of paper read before Instn. Engrs.' Club.

AIRPLANE ENGINES

Radiators. The Andre Hexagonal Tube Radiator, R. F. Steidel. Aviation, vol. 16, no. 26, June 30, 1924, pp. 697–698, 7 figs. Basic feature of improved honeycomb radiator manufactured by French concern; results of official tests; how weight is saved.

AIRPLANE PROPELLERS

Design and Performance Calculations. The Application of Propeller Test Data to Design and Performance Calculations, W. S. Diehl. Nat. Advisory Com. for Aeronautics, report no. 186, 1924. Study of test data on family of Durand's propellers (nos. 3, 7, 11, 82, 113, 139).

AIRPLANES

German. German Light Airplanes (Deutsche Leichtflugzeuge), W. v. Langsdorff. Luftfahrt, vol. 28, no. 4, Apr. 1924, pp. 64–67, 5 figs. Structural and technical details of Daimler 7 to 9-hp. airplane and account of author's record flight with this machine.

Prague Show. The Third International Aero Show at Prague. Flight, vol. 16, nos. 23, 24 and 25, June 5, 12 and 19, 1924, pp. 356–365, 380–386 and 395–401, 81 figs. June 5: Descriptions of Czechoslovak airplanes exhibited. June 12: Descriptions of French and German airplanes exhibited. June 19: Construction of machines that merit closer inspection.

Wings. A Generalization of the Schukowsky Wing Model (Eine Verallgemeinerung der Schukowskyschen Flügelabbildung), A. Betz. Zeit. für Flugtechnik u. Motorluftschiffahrt, vol. 15, no. 10, May 26, 1924, p. 100, 2 figs. Points out that by slight change in original Schukowsky method, useful profiles can be obtained.

Calculation of Self-Contained Wings in Two- and Three-Ribbed Rigid-Frame Form [Zur Berechnung freitragender Flugzeugflügel in zwei- und dreiholmiger Steifrahmenform (Vierendeel-Rostträger)], K. Thalau. Zeit. für Flugtechnik u. Motorluftschiffahrt, vol. 15, no. 10, May 26, 1924, pp. 103–109, 15 figs. Calculations for both two-ribbed and three-ribbed wings.

Experimental Results with Slotted Wings (Neuere Versuchsergebnisse mit Spaltflügeln), G. Lachmann. Zeit. für Flugtechnik u. Motorluftschiffahrt, vol. 15, no. 10, May 26, 1924, pp. 109–116, 20 figs. Influence of arrangement of slots; reduction of profile resistance with normal flight; improvement of steering capacity with lower speeds.

Wood, Use in Construction. Some Recent Developments in the Use of Wood in Airplane Construction, W. M. Moore. Jl. of Forestry, vol. 22, no. 4, Apr. 1924, pp. 353–371. Kinds of wood used, species of wood permitted by Air Service specifications, use of plywood, defects in wood which affect its suitability for airplane manufacture, storage of airplane parts, balloon baskets, and wood versus metal in airplane construction.

AIRSHIPS

Atmospheric Electricity, Effect on. Airship Flight and Atmospheric Electricity (Luftschiffahrt und atmosphärische Elektrizität), E. Herrera. Luftfahrt, vol. 28, no. 4, Apr. 1924, pp. 59–61, 6 figs. Study of storm hazard with regard to balloon and airship flight. Translated from Spanish.

Italian. The Italian N-Airship (Das italienische N-Luftschiff), W. Scherz. Luftfahrt, vol. 28, no. 4, Apr. 1924, pp. 62–64, 3 figs. Structural details of airship developed by U. Nobile, with carrying capacity of 20 passengers, and equipped with three 240-hp. Maybach engines; max. speed, 100 km. per hr.

ALLOY STEELS

Brittle Range. Brittle Range in Low-Alloy Steels, M. A. Grossman. Iron Age, vol. 114, no. 3, July 17, 1924, pp. 149–151, 4 figs. Behavior of austenite during quenching and drawing a probable cause. Sensitive method of measuring change in volume.

Development. The Development of Alloy Steels, R. Hadfield. Iron & Coal Trades Rev., vol. 108, no. 2939, June 27, 1924, pp. 1120–1122, 1 fig. Gives comprehensive survey, largely historical, of development of alloy steels and important position they have attained in metallurgical and engineering industries. Paper read before Iron & Steel Sec., Empire Min. & Met. Congress.

Locomotives. Alloy Steels versus Carbon Steels for Locomotives. Ry. Engr., vol. 45, no. 533, June 1924, pp. 198–200. Review of subject of alloy steel, advantages of "straight" carbon steels, case-hardening steel, special steels for locomotive work, and alloy-steel "defects."

ALLOYS

Aluminum. See ALUMINUM ALLOYS.

Copper. See COPPER ALLOYS.

Corrosion-Resisting, Properties of. Tabular Presentation of Chemical and Physical Properties of Corrosion-Resisting Alloys. Chem. & Met. Eng., vol. 31, no. 2, July 14, 1924, pp. 79–83. Tables incorporating that part of systemized compilation made by a committee of members of Am. Soc. for Testing Matls. of available data regarding those alloys having iron, nickel or copper as predominating element and offering resistance to various destructive agencies, which is of value to chemical engineer.

ALUMINUM ALLOYS

Use on Board Ship. Aluminum and Aluminum Alloys for Use on Board Ship, E. M. Hewlett and D. Basch. Am. Soc. Nav. Engrs.—Jl., vol. 36, nos. 1 and 2, Feb. and May 1924, pp. 1–17 and 288–301. Feb.: Fabricated alloys; rolling; forging. May: Soldering of aluminum; welding; aluminum in contact with other metals; use for electrical purposes.

APPRENTICES, TRAINING OF

Germany. Workers' Education and Training. Monthly Labor Rev., vol. 18, no. 5, May 1924, pp. 178–181. Apprenticeship on German State railroads and in Berlin metal industry.

ASH HANDLING

Plants. Ash-Removing Plants (Entaschungsanlagen), H. Esselbach. Wärme, vol. 47, no. 22, May 30, 1924, pp. 255–256, 3 figs. Describes plants of Roath Power Works in Cardiff and of Underfeed Stoker Co.

AUTOMOBILE ENGINES

Air Cleaners. Air-Filters, L. L. Dollinger. Soc. Automotive Engrs.—Jl., vol. 15, no. 1, July 1924, pp. 66–68. Effect of road dust and grit on cylinders and valves; benefits derived from filtering air; requirements of a filter.

Recent Observations of Air-Cleaning Devices, C. P. Grimes. Soc. Automotive Engrs.—Jl., vol. 15, no. 1, July 1924, pp. 63–65, 1 fig. Author summarizes his experiences and conclusions covering last 3 years. Reasons and experiences leading up to recommendation of self-ejecting centrifugal dry air cleaner.

Testing of Air-Cleaners, A. B. Squyer. Soc. Automotive Engrs.—Jl., vol. 15, no. 1, July 1924, pp. 33–37, 5 figs. Requirements of a good air cleaner are maximum efficiency, minimum of attention from operator and minimum power loss. Deals with development of laboratory methods to determine relative values of various air cleaners as such, especially first requirement, maximum efficiency.

Crankcase-Oil Dilution. A Possible Solution of the Crankcase-Oil Dilution Problem, I. L. Anderson. Soc. Automotive Engrs.—Jl., vol. 15, no. 1, July 1924, pp. 43–46, 6 figs. Describes method which consists of removing gasoline from crankcase by ventilation; apparatus used and results of tests.

Water in Crankcase Oils, A. L. Clayden. Soc. Automotive Engrs.—Jl., vol. 15, no. 1, July 1924, pp. 47–50, 3 figs. Effect of using an emulsifying oil; amounts of water actually deposited because of cylinder-wall condensation; effects on lubrication; determination of water-deposition rate.

Oil Consumption and Dilution. Engine-Oi Consumption and Dilution, N. MacCoull. Soc. Automotive Engrs.—Jl., vol. 15, no. 1, July 1924, pp. 93–100, 15 figs. First results of tests made by Texas Co., New York City, on five 7½-ton trucks during regular course of business deliveries. Curves plotted from data obtained. Details of dynamometer tests. Description of dynamometer apparatus and engine used, and analysis of result of wear of test engine.

AUTOMOBILE MANUFACTURING PLANTS

Ford Motor Company of Canada. Building a Car a Minute at Ford City, H. P. Armson. Can. Machy., vol. 31, no. 26, June 26, 1924, pp. 41–48 and 80, 9 figs. Description of 15-acre machine shop of Ford Motor Co. of Canada, and of some operations.

Building A Car A Minute At Ford City, A Murphy Power House, vol. 17, no. 11, June 5, 1924, pp. 29–36, 8 figs. Description of new power plant of Ford Motor Co. of Canada.

Ford's New $10,000,000 Factory at Ford. Can. Mfr., vol. 44, no. 6, June 1924, pp. 11–15, 5 figs. Layout of plant, construction of buildings and description of machine shop.

Parts Handling. Cutting Costs by the Use of Conveyors, F. H. Colvin. Am. Mach., vol. 60, no. 26, June 26, 1924, pp. 969–971, 7 figs. Some of the Maxwell methods of handling chassis and bodies in their various stages, and some time-saving devices employed.

AUTOMOBILES

Bodies, Manufacture of. Manufacturing All

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NOTE.—The abbreviations used in indexing are as follows:

Academy (Acad.)
American (Am.)
Associated (Assoc.)
Association (Assn.)
Bulletin (Bul.)
Bureau (Bur.)
Canadian (Can.)
Chemical or Chemistry (Chem.)
Electrical or Electric (Elec.)
Electrician (Elecn.)
Engineer[s] (Engr.[s])
Engineering (Eng.)
Gazette (Gaz.)
General (Gen.)
Geological (Geol.)
Heating (Heat.)
Industrial (Indus.)
Institute (Inst.)
Institution (Instn.)
International (Int.)
Journal (Jl.)
London (Lond.)
Machinery (Machy.)
Machinist (Mach.)
Magazine (Mag.)
Marine (Mar.)
Materials (Matls.)
Mechanical (Mech.)
Metallurgical (Met.)
Mining (Min.)
Municipal (Mun.)
National (Nat.)
New England (N. E.)
Proceedings (Proc.)
Record (Rec.)
Refrigerating (Refrig.)
Review (Rev.)
Railway (Ry.)
Scientific or Science (Sci.)
Society (Soc.)
State names (Ill., Minn., etc.)
Supplement (Supp.)
Transactions (Trans.)
United States (U. S.)
Ventilating (Vent.)
Western (West.)

Classified List of Mechanical Equipment

Manufactured by Firms Represented in MECHANICAL ENGINEERING

FOR ALPHABETICAL LIST OF ADVERTISERS, SEE PAGE 148

Accumulators, Hydraulic
Farrel Foundry & Machine Co.
Mackintosh-Hemphill Co.
* Worthington Pump & Mchry. Corp'n

Aftercoolers, Air
* Ingersoll-Rand Co.

Agitators
Hill Clutch Machine & Fdry. Co.

Air Compressors, Receivers, etc.
(See Compressors, Receivers, etc., Air)

Air Conditioning Apparatus
* American Blower Co.
* Carrier Engineering Corp'n
* Clarage Fan Co.
* Sturtevant, B. F. Co.

Air-Jet Lifts
* Schutte & Koerting Co.

Air Washers
* American Blower Co.
* Carrier Engineering Corp'n
* Clarage Fan Co.
* Cooling Tower Co. (Inc.)
* Sturtevant, B. F. Co.

Alloys
Driver-Harris Co.

Alloys (Calite)
Calorizing Co.

Ammeters
* Bristol Co.
* General Electric Co.
* Westinghouse Electric & Mfg. Co.

Anemometers
* Taylor Instrument Cos.
Weber, F. Co. (Inc.)

Annealing
* American Metal Treatment Co.
Nuttall, R. D. Co.

Arc Welding Equipment
* Westinghouse Elec. & Mfg. Co.

Arches, Boiler Furnace
* McLeod & Henry Co.
* Titusville Iron Works Co.

Arches, Fire Door
* McLeod & Henry Co.

Arches, Ignition (Flat Suspended)
* Combustion Engineering Corp'n
* McLeod & Henry Co.

Asbestos Products
Carey, Philip Co.
Garlock Packing Co.
Johns-Manville (Inc.)

Ash Lifts, Telescopic
Palmer-Bee Co.

Autoclaves
Farrel Foundry & Machine Co.

Babbitt Metal
* Medart Co.
* Westinghouse Elect. & Mfg. Co.

Ball Bearings, Gages, etc.
(See Bearings, Gages, Ball)

Balls, Brass and Bronze
* Atlas Ball Co.
* Gwilliam Co.

Balls, Steel
* Atlas Ball Co.
* Gwilliam Co.
* New Departure Mfg. Co.
* S K F Industries (Inc.)

Barometers
* American Schaeffer & Budenberg Corp'n
* Taylor Instrument Cos.

Barometers, Mercurial
* Tagliabue, C. J. Mfg. Co.

Bearings, Ball
Fafnir Bearing Co.
* Gwilliam Co.
Marlin-Rockwell Corp'n
* New Departure Mfg. Co.
* Norma-Hoffmann Bearings Corp'n
* S K F Industries (Inc.)
* Strom Ball Bearing Mfg. Co.

Bearings, Collar Oiling
Hill Clutch Machine & Foundry Co.

Bearings, Dadial Thrust
* New Departure Mfg. Co.

Bearings, Roller
* Gwilliam Co.
* Hyatt Roller Bearing Co.
* Norma-Hoffmann Bearings Corp'n
* Royersford Fdry. & Mach. Co.
* Timken Roller Bearing Co.

Bearings, Self-Oiling
* Brown, A. & F. Co.
* Doehler Die-Casting Co.
* Falls Clutch & Machinery Co.
Hill Clutch Machine & Fdry. Co.
* Jones, W. A. Fdry. & Mach. Co.
Link-Belt Co.
* Royersford Fdry. & Mach. Co.
* Wood's, T. B. Sons Co.

Bearings, Tapered
* Timken Roller Bearing Co.

Bearings, Thrust
Fafnir Bearing Co.
* General Electric Co.
* Gwilliam Co.
Hill Clutch Machine & Fdry. Co.
* Norma-Hoffmann Bearings Corp'n
* S K F Industries (Inc.)
* Strom Ball Bearing Mfg. Co.
* Timken Roller Bearing Co.

Belt Dressing
* Dixon, Joseph Crucible Co.
Gandy Belting Co.

Belt Lacing, Steel
* Bristol Co.

Belt Tighteners
* Brown, A. & F. Co.
Hill Clutch Machine & Fdry. Co.
* Jones, W. A. Fdry. & Mach. Co.
Link-Belt Co.
* Medart Co.
* Smidth, F. L. & Co.
* Wood's, T. B. Sons Co.

Belt Tighteners, Automatic
Hill Clutch Machine & Foundry Co.

Belting, Canvas (Stitched)
Gandy Belting Co.
* U. S. Rubber Company

Belting, Conveyor
Gandy Belting Co.
* Goodrich, B. F. Rubber Co.
* United States Rubber Co.

Belting, Elevator
Gandy Belting Co.
* Goodrich, B. F. Rubber Co.
* United States Rubber Co.

Belting, Endless
Gandy Belting Co.

Belting, Fabric
Gandy Belting Co.

Belting, Rubber
* Goodrich, B. F. Rubber Co.
* United States Rubber Co.

Belting, Waterproof
Gandy Belting Co.

Bending & Straightening Machines
* Long & Allstatter Co.

Bends, Pipe
* Frick Co. (Inc.)
* Vogt, Henry Machine Co.

Billets, Steel
* Timken Roller Bearing Co.

Blocks, Tackle
Clyde Iron Work Sales Co.
* Roebling's, John A. Sons Co.

Blowers, Centrifgual
* American Blower Co.
* Clarage Fan Co.
* Coppus Engineering Corp'n
* De Laval Steam Turbine Co.
* General Electric Co.
* Ingersoll-Rand Co.
* Kerr Turbine Co.
* Sturtevant, B. F. Co.
* Westinghouse Electric & Mfg. Co.

Blowers, Fan
* American Blower Co.
* Clarage Fan Co.
* Coppus Engineering Corp'n
* Green Fuel Economizer Co.
* Sturtevant, B. F. Co.

Blowers, Forge
* American Blower Co.
* Sturtevant, B. F. Co.

Blowers, Pressure
* American Blower Co
* Clarage Fan Co.
Lammert & Mann Co
* Sturtevant, B. F. Co.

Blowers, Rotary
Lammert & Mann Co.
* Schutte & Koerting Co.
* Sturtevant, B. F. Co.

Blowers, Soot
Diamond Power Specialty Corp'n
* Sturtevant, B. F. Co.

Blowers, Steam Jet
* Schutte & Koerting Co.

Blowers, Turbine
* Coppus Engineering Corp'n
* Sturtevant, B. F. Co.

Blueing (Metal)
* American Metal Treatment Co.

Boards, Drawing
Dietzgen, Eugene Co.
Keuffel & Esser Co.
New York Blue Print Paper Co.
ParVell Laboratories
U. S. Blue Co.
Weber, F. Co. (Inc.)

Boiler Baffles
* King Refractories Co. (Inc.)
* McLeod & Henry Co.

Boiler Compounds
* Dixon, Joseph Crucible Co.
Unisol Mfg. Co.

Boiler Coverings, Furnaces, Tube Cleaners, etc.
(See Coverings, Furnaces, Tube Cleaners, etc., Boiler)

Boiler Fronts
* O'Brien, John Boiler Works Co.
* Titusville Iron Works Co.

Boiler Settings, Steel Cased
* Casey-Hedges Co.
* McLeod & Henry Co.
* O'Brien, John Boiler Works Co.
* Vogt, Henry Machine Co.
* Walsh & Weidner Boiler Co.

Boilers, Heating
* Casey-Hedges Co.
* Erie City Iron Works
* Keeler, E. Co.
* Leffel, James & Co.
Lidgerwood Mfg. Co.
* O'Brien, John Boiler Works Co.
* Titusville Iron Works Co.
* Union Iron Works
* Walsh & Weidner Boiler Co.

Boilers, Locomotive
* Casey-Hedges Co.
* Keeler, E. Co.
* Leffel, James & Co.
* Titusville Iron Works Co.
* Union Iron Works
* Walsh & Weidner Boiler Co.

Boilers, Marine (Scotch)
Bethlehem Shipbldg.Corp'n(Ltd.)
* Casey-Hedges Co.
* Leffel, James & Co.
* Titusville Iron Works Co.
* Walsh & Weidner Boiler Co.

Boilers, Marine (Water Tube)
* Babcock & Wilcox Co.
Bethlehem Shipbldg.Corp'n(Ltd.)
* Casey-Hedges Co.
* Connelly, D. Boiler Co.
* O'Brien, John Boiler Works Co.
* Springfield Boiler Co.
* Titusville Iron Works Co.
* Walsh & Weidner Boiler Co.

Boilers, Portable
* Casey-Hedges Co.
* Erie City Iron Works
* Frick Co. (Inc.)
* Keeler, E. Co.
* Leffel, James & Co.
Lidgerwood Mfg. Co.
* O'Brien, John Boiler Works Co
* Titusville Iron Works Co.
* Union Iron Works
* Walsh & Weidner Boiler Co.

Boilers, Tubular (Horizontal Return)
* Bigelow Co.
* Casey-Hedges Co.
* Cole, R. D. Mfg. Co.
* Connelly, D. Boiler Co.
* Erie City Iron Works
* Keeler, E. Co.
* Leffel, James & Co.

Boilers, Tubular (Horizontal Return)
Lidgerwood Mfg. Co.
Morrison Boiler Co.
* O'Brien, John Boiler Works Co
* Titusville Iron Works Co.
* Union Iron Works
* Vogt, Henry Machine Co.
* Walsh & Weidner Boiler Co.
* Webster, Howard J.
* Wickes Boiler Co.

Boilers, Tubular (Vertical Fire)
* Bigelow Co.
* Casey-Hedges Co.
Clyde Iron Works Sales Co
* Keeler, E. Co.
* Leffel, James & Co.
Lidgerwood Mfg. Co.
Morrison Boiler Co.
* O'Brien, John Boiler Works Co
* Titusville Iron Works Co.
* Union Iron Works
* Walsh & Weidner Boiler Co.

Boilers, Water Tube (Horizontal)
* Babcock & Wilcox Co.
Bethlehem Shipbldg.Corp'n(Ltd.)
* Casey-Hedges Co.
* Cole, R. D. Mfg. Co.
* Connelly, D. Boiler Co.
* Edge Moor Iron Co.
* Erie City Iron Works
* Keeler, E. Co.
* Ladd, George T. Co.
Morrison Boiler Co.
* O'Brien, John Boiler Works Co.
* Springfield Boiler Co.
* Union Iron Works
* Vogt, Henry Machine Co.
* Walsh & Weidner Boiler Co.
* Wickes Boiler Co.

Boilers, Water Tube (Inclined)
* Babcock & Wilcox Co.
Bethlehem Shipbldg.Corp'n(Ltd.)
* Bigelow Co.
* Casey-Hedges Co.
* Keeler, E. Co.
* Ladd, George T. Co.
Morrison Boiler Co.
* O'Brien, John Boiler Works Co.
* Vogt, Henry Machine Co.
* Walsh & Weidner Boiler Co.

Boilers, Water Tube (Vertical)
* Babcock & Wilcox Co.
* Bigelow Co.
* Casey-Hedges Co.
* Erie City Iron Works
* Keeler, E. Co.
* Ladd, George T. Co.
Morrison Boiler Co.
* O'Brien, John Boiler Works Co
* Walsh & Weidner Boiler Co.
* Wickes Boiler Co.

Boring and Drilling Machines
Universal Boring Machine Co.

Boring, Drilling and Milling Machines (Horizontally Combined)
Universal Boring Machine Co.

Boxes, Carbonizing
Driver-Harris Co.

Boxes, Case Hardening
Driver-Harris Co.

Brake Blocks
Johns-Manville (Inc.)

Brakes, Air
* Allis-Chalmers Mfg. Co.
* General Electric Co.

Brass Goods
* Scovill Mfg. Co.

Brass Mill Machinery
Farrel Foundry & Machine Co.

Breechings, Smoke
Morrison Boiler Co.
* Titusville Iron Works Co.
* Vogt, Henry Machine Co.

Brick, Fire
* Bernitz Furnace Appliance Co.
* Celite Products Co.
* Drake Non-Clinkering Furnace Block Co.
Keystone Refractories Co.
* King Refractories Co. (Inc.)
* McLeod & Henry Co.
Maphite Co. of Amer.

*Catalogue data of firms marked * appear in the A.S.M.E. Condensed Catalogues of Mechanical Equipment, 1923-24 Volume*

Steel Automobile Bodies, J. W. Meadowcroft. Am. Welding Soc.—Jl., vol. 3, no. 5, May 1924, pp. 24–26. Particulars of welding operations.

Rover Develops Modified Type of Weymann Fabric Body, M. W. Bourdon. Automotive Industries, vol. 51, no. 2, July 10, 1924, pp. 104–107, 12 figs. New design incorporates some metal panels where rounded corners are desired, but entire structure is covered with leather fabric. Lining materials are waterproofed. Door pillars have inward curve. Air gap or cloth strip used at all joints to prevent squeaks.

Body Finishing. Automobile Body Finishing with Abrasives. Abrasive Industry, vol. 5, no. 7, July 1924, pp. 171–173, 6 figs. Notes on methods followed by Chandler Motor Car Co., Cleveland.

Brakes, Four-Wheel. Hydraulic Brakes on Test, H. F. Blanchard. Autocar, vol. 52, no. 1495, June 13, 1924, pp. 1070–1072, 5 figs. Further details of Lockheed four-wheel system with data gleaned from actual trials.

British Empire Exhibition. The British Empire Exhibition. Automobile Engr., vol. 14, no. 190, June 1924, pp. 175–181, 14 figs. Notes on automobile manufacturers' exhibits.

Buick. Buick Adds a New Six to Its Line with Slight Changes in Design. Automotive Industries, vol. 51, no. 2, July 10, 1924, pp. 92–96, 9 figs. Particulars of Standard Six, having 3 by 4½ in. cylinders, giving it a displacement of 191 cu. in., and 114 ¾-in. wheelbase. New Fisher self-ventilating windshield used on Buick closed cars.

Chassis Construction. Lighter Chassis Is Not Likely Until Body Weight Is Decreased, W. L. Carver. Automotive Industries, vol. 51, no. 1, July 3, 1924, pp. 30–33, 4 figs. Advent of leather in place of steel panels among promising possibilities. Balloon tires, smaller wheels and tubular axles help decrease mass of unsprung parts. Present stiff and heavy frames considered necessary to prevent wearing and rattles.

Cleveland. New Cleveland Model Has Centralized Chassis Lubricating System. Automotive Industries, vol. 50, no. 25, June 19, 1924, pp. 1314–1318, 7 figs. Nearly all mechanical units are redesigned and wheelbase is lengthened; 31 M 5.25-in. balloon tires are standard equipment.

Crossley. The 14 H.P. Crossley Car. Auto-Motor Jl., vol. 29, no. 26, June 26, 1924, pp. 539–541, 9 figs. Has wheelbase of 9 ft. 4½ in.; 4 cylinders; engine is supported in chassis frame by 2 arms; cylinder heads are detachable in one water-jacketed casting; carburetor is vertical type Solex.

Diatto. The Two-Litre Diatto. Automobile Engr., vol. 14, no. 190, June 1924, pp. 158–164, 13 figs. Details of medium-power Italian chassis, with 4-cylinder overhead valve engine, assembled in one unit with gear box, and enclosed propeller shaft transmitting power to spiral bevel axle.

Electric, Small. Small Electric Motorcars. Eng. Progress, vol. 5, no. 6, June 1924, pp. 117–119, 7 figs. Describes two types of small electric automobiles manufactured in Germany, one by SB-Automobil-Ges. of Charlottenburg, and Hawa car, made by Hannoversche Waggonfabrik, Hannover-Linden.

Finishing Materials. What Basic Materials Go Into Automobile Finishes? Automotive Industries, vol. 51, no. 1, July 3, 1924, pp. 34–38. Information regarding nature of materials used in finishing of automobile bodies and chassis.

Franklin. Franklin Increases Power 33 Per Cent by Changes in Air Cooling System, P. M. Heldt. Automotive Industries, vol. 51, no. 2, July 10, 1924, pp. 101–103, 7 figs. Improvements include quickened acceleration, greater maximum speed and a more plentiful supply of oil to cylinder walls. Balloon-type tires on all models.

German. Small German Automobiles (Neue "Berufs-Kleinkraftwagen"), E. Meyer. Motorwagen, vol. 27, no. 15, May 31, 1924, pp. 262–264, 2 figs. Details of new 4/14-hp. Tatra small car.

Grand Prix. Three Grand Prix Cars. Autocar, vol. 53, no. 1498, July 4, 1924, pp. 19–23, 9 figs. Gives details of 12-cylinder Delage, 8-cylinder Bugatti and 6-cylinder Sunbeam races to compete in 2-liter struggle at Lyons. Delage: 12 cylinders are in 2 groups of 6, mounted on aluminum base chamber, cylinder bore is 51.3: Bugatti: 8 cylinders of 60 × 88 mm. bore and stroke with 3 valves per cylinder: Sunbeam: 6-cylinder of 67 M 94 mm. bore and stroke.

Headlighting Devices, Laboratory Tests for. Specifications of Laboratory Tests for Approval of Electric Headlighting Devices for Motor Vehicles. U. S. Bur. Labor Statistics—Bul., no. 350, Jan. 1924, 5 pp., 1 fig. Tentative American standard approved Nov. 11, 1922 by Am. Eng. Standards Committee.

Hillman. The Hillman Car. Auto-Motor Jl., vol. 29, no. 25, June 19, 1924, pp. 517–519, 9 figs. Describes well-designed all-weather vehicle with most efficient power and transmission plant; 4-cylinder engine, with bore of 65 mm. and piston travel of 120 mm.; R. A. C. rating of 10.4 hp.

Humber. The 11.4 H.P. Humber, E. N. Duffield. Auto-Motor Jl., vol. 29, no. 26, June 26, 1924, pp. 531–533, 5 figs. Car is smaller edition of 15.9; the four cylinders have their inlet valves overhead and lower section of crankcase is flared to form clutch pit, continued to constitute lower portion of gear box.

Morris. Morris Cars. Auto-Motor Jl., vol. 29, no. 24, June 12, 1924, pp. 499–501, 10 figs. Particulars of latest models. Made in two types, the Cowley, having 11.9-hp. engine, 69.5 bore and 102 stroke, and the Oxford, rated at 14.28 hp., and having bore of 75 and a stroke of 102.

Rickenbacker. New Rickenbacker Vertical Eight Will Supplement the Six, J. E. Schipper. Automotive Industries, vol. 50, no. 26, June 26, 1924, pp. 1369–1372, 5 figs. Airplane type of oil tubing, radiating fins on cast-aluminum oil pan, cold blast for cooling oil in summer, duplex carburetor and camshaft always immersed in oil are features.

Sangiusto. New Type of Automobile (Nuovo tipo di automobile). Industria, vol. 38, no. 8, Apr. 30, 1924, pp. 224–225, 2 figs. Details of 8-hp. car made by Sangiusto Company, Milan; car has box-girder type of chassis, with engine mounted at rear.

Shock Absorbers. The D. N. Shock Absorber. Auto-Motor Jl., vol. 29, no. 27, July 3, 1924, pp. 562–563, 2 figs. Principle underlying D. N. device is that of allowing compression or extension of spring to be always free and unrestrained, while rebound only and in each direction is checked or damped.

Talbot. New 16–50 hp. Talbot Car. Autocar, vol. 53, no. 1498, July 4, 1924, pp. 24–25, 5 figs. New family model 6-cylinder with engine of just over 2½ liters; 3-speed and reverse gear box and one unit with engine.

B

BAGASSE

Drying with Flue Gases. Calculation of the Economy of Fuel Realized on Drying Bagasse with Flue Gases, E. Mooyaart. Int. Sugar Jl., vol. 26, no. 305, May 1924, pp. 252–254. According to given calculations, if bagasse having 47 per cent of water be dried by means of flue gases to material having 15 per cent of water, an economy of 15 per cent of fuel can be realized.

BALANCING MACHINES

Dynamic. Balancing of Rotating Masses (Das Auswuchten Umlaufender Massen), M. Krause. Praktische Maschinen-Konstrukteur, vol. 57, no. 17, May 13, 1924, pp. 229–232, 20 figs. Shows that static balancing of machine parts is by no means adequate; describes machine which enables correct dynamic balancing.

BEARINGS

Sealed-Sleeve Motor. Sleeve Bearing Keeps Oil From Spattering Motor, R. Pruger. Coal Age, vol. 25, no. 26, June 26, 1924, pp. 945–947, 4 figs. Describes "sealed-sleeve" bearing which excludes dirt and prevents oil leakage.

BEARINGS, BALL

Function and Mounting of. Ball Bearings: Their Proper Function and Methods of Mounting, F. J. Taylor. Mech. Wld., vol. 75, no. 1953, June 6, 1924, pp. 353–354, 9 figs.

BEARINGS, ROLLER

Design. Roller Bearings Facilitate Speed, D. E. Batesole. Iron Trade Rev., vol. 75, no. 3, July 17, 1924, pp. 164–166, 6 figs. High-precision units of roller type withstand heavy load capacity and resistance to severe shock. Choice of bearing depends upon operating conditions and design. Describes principle of construction.

Mill Motors. Roller Bearing Service In Mill-Type Motors, L. J. Hess. Indus. Engr., vol. 82, no. 4, Apr. 1924, pp. 164–168, 6 figs. Methods of installation and results obtained from use of roller bearings in 300 heavy-duty motors.

BLAST FURNACES

Air Heaters for. The Development of Air-Heater Apparatus in Blast Furnaces (Die Entwicklung der Winderhitzer-Apparate beim Hochofen), Illies. Feuerungstechnik, vol. 12, nos. 16 and 17, May 15 and June 1, 1924, pp. 133–136 and 144–145, 9 figs. The beginning of air heating in Germany; steel air-heating apparatus; introduction of checkerbrick heaters; the Pfoser-Strack-Stumm process.

British Practice. Modern British Blast Furnaces, F. Clements. Iron & Coal Trades Rev., vol. 108, nos. 2936 and 3937, June 6 and 13, 1924, pp. 959–965 and (discussion) 1024, 9 figs. Description with statistics of certain blast-furnace plants in England of a more modern type as representing position to which British design and practice has advanced. Paper read at Empire Mining and Metallurgical Congress.

Design. Interior Profiles of Modern Blast Furnaces (Die inneren Formen neuzeitlicher Hochöfen), G. Jantzen. Stahl u. Eisen, vol. 44, no. 24, June 12, 1924, pp. 681–684. Examples of old and new cross-sectional profiles; dropping of charge, conclusions for interior profile of furnace, gasification of coke and diameter of hearth, uniform sizing of elements of charge, etc.

Design. Progress Made in the Production of Pig Iron and the Construction of Blast Furnaces (Progrès réalisés dans la fabrication de la fonte et la construction des hauts fourneaux), J. Estour. Technique Moderne, vol. 16, no. 9, May 1, 1924, pp. 309–319, 13 figs. Notes on constitution of pig iron; manufacture and combustibility of coke; enrichment, briquetting and sintering of ore; cross-section and dimensions of blast furnaces; design; charging apparatus.

Fuel Economy. The Law of Heat Concentration and Fuel Economy in Blast Furnaces (La loi de la compression de la chaleur et l'économie de combustible dans les hauts fourneaux), A. Korevaar. Chimie & Industrie, vol. 11, no. 4, Apr. 1924, pp. 642–650, 2 figs. Deduction of law of heat concentration; variations of factors depending on carbon; problem of combustibility of fuels; factors depending on air and concentration of heat, and on furnace and concentration of heat; influence of conduction; analysis of fuel consumption in blast furnace; influence of inflammability of coke on fuel consumption: influence of preheating of air and of furnace diameter on carbon.

BOILER FURNACES

Coal vs. Oil Fuel. Fuel Oil or Coal for Steam Generation, F. H. Daniels. Steam Coal Buyer, vol. 1, no. 2, Feb. 1924, pp. 11–15, 8 figs. Shows that fuel oil cannot compete with coal for generation of steam in land plants except for short periods of time.

Firing. Firing a Hand-Fired Down-Draft Furnace, J. F. Barkley. U. S. Bur. Mines, Reports of Investigations, No. 2609, May 1924, 6 pp. Method used and results obtained in testing a hand-fired down-draft furnace at a plant in Wash., D. C. in order to determine method of firing that would give best results with a minimum of smoke.

Lining. Reducing the Cost of Relining Boiler Furnaces. Power, vol. 59, no. 26, June 24, 1924, pp. 1028–1030, 5 figs. Most successful and economical lining material has been found to be combination of crushed used firebrick, fireclay and sodium silicate (water glass) applied by means of air gun in form of spray.

BOILER PLANTS

Flue-Dust Separator. Flue Dust and Forced Draught. Engineer, vol. 137, no. 3573, June 20, 1924, p. 696, 3 figs. Describes "cindervane" fan for Stepney power house which combines dual functions of dust separator and induced-draft fan.

Instruments. Modern Boiler-room Instruments, J. Wolf. Combustion, vol. 11, no. 1, July 1924, pp. 40–42. Discussion of place held by instruments in modern boiler room and of particular functions and advantages of some of the more important types.

Wembley Exhibition, England. The Boiler House at the British Empire Exhibition, Wembley, London, J. D. Troup. Combustion, vol. 11, no. 1, July 1924, pp. 36–39, 5 figs. Description of boiler plant which is not only an exhibit of a number of different types of equipment, but actually furnishes power used at the Exhibition.

Wembley Boiler House. Eng. & Boiler House Rev., vol. 37, nos. 6, 7, 8 and 9, Jan., Feb., Mar. and Apr. 1924, pp. 191–193, 236–238, 284, and 316–318, 12 figs. Description of installations at British Empire Exhibition, Wembley. Jan.: Babcock & Wilcox boilers. Feb.: Installation by John Thompson Water-Tube Boilers, Ltd. Mar. and Apr.: Instruments for recording coal, water, and steam used, and for recording temperatures, draft, and flue-gas contents.

BOILER OPERATION

Efficiency. Operation of Steam Boiler Plants, E. B. Ricketts. Power Plant Eng., vol. 28, no. 14, July 15, 1924, pp. 749–751. Discussion of some of the more important factors which contribute to efficient boiler operation. Emphasizes fact that basis of good boiler operation is a thorough knowledge on part of all men in plant of materials and apparatus with which they must deal and thorough and consistent coöperation of management and men in common aim of stopping all leaks and keeping them stopped. Address before Nat. District Heat. Assn.

The Control of Power Production, C. L. Hubbard. Factory, vol. 33, no. 1, July 1924, pp. 26–29, 96, 98 and 100, 13 figs. Fundamental functions of a good boiler.

BOILER ROOMS

Electric Drive. Motor Applications in the Boiler Room, H. W. Smith. Power Plant Eng., vol. 28, no. 13, July 1, 1924, pp. 700–703, 6 figs. D.c. motors and control for stoker and clinker grinders; 2- and 4-speed squirrel-cage motors; wound rotor motors; forced- and induced-draft fans; boiler feed pump; coal-handling equipment.

Steam-Generating Units, Standardization of. Standardized Steam Generating Units, A. J. T. Taylor. Combustion, vol. 11, no. 1, July 1924, pp. 64–66. A plan suggested for purchase of boiler room equipment as a complete unit.

BOILERS

Benson Superpressure. Testing the Benson Superpressure Generator, D. Brownlie. Power House, vol. 17, no. 11, June 5, 1924, pp. 43 and 60. Success of coil boiler operated at approximately 3200 lb. pressure per sq. in. and 706 deg. fahr. in Rugby Works of English Elec. Co., reported.

Combustion Control. Combustion Control for Boilers, R. J. S. Pigott. Paper, vol. 34, no. 9, June 19, 1924, pp. 368–371. What automatic regulation of boilers will accomplish in the way of efficiency and control of capacity. Principle of design.

Heat Transmission. Heat Transmission in Boilers Chas. F. Wade. Power Engr., vol. 19, no. 219, June 1924, pp. 224–226, 4 figs. Discussion of principles and suggestions for improvements; deals with "luminous" flames, conduction, gas films and temperatures.

Heating, Smokeless. Smokeless Heating Boilers, T. N. Thomson. Plumbers Trade Jl., vol. 77, no. 1, July 1, 1924, pp. 26–28 and 92, 3 figs. Development and manufacture of Utica Imperial smokeless boiler.

Large-Capacity. Large-Capacity Boilers for Central Stations. Pulverized-Coal-Fired Boilers (Chaudières à grande capacité pour centrales électriques. Les chaudières au charbon pulverisé), M. Demoulin. Génie Civil, vol. 84, no. 20, May 17, 1924, pp. 465–471, 7 figs. Characteristics of large boiler types; evolution of boilers; the Ladd-Belleville in Vitry (Seine) central station; new boilers of the Union d'Electricité for burning of pulverized coal.

Marine. See MARINE BOILERS.

BRAKES

Air. The Air Brake Problem. Car Foremen's Assn. of Chicago—Proc., May 1924, pp. 15–35 and (discussion) 35–55. Deals with maintenance, discussing fundamentals of air brakes to the end that proper significance be applied to relative parts.

Manufactured by Advertisers — CLASSIFIED LIST OF MECHANICAL EQUIPMENT — Alphabetical List on page 148

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*Catalogue data of firms marked * appear in the A.S.M.E. Condensed Catalogues of Mechanical Equipment, 1923-24 Volume*

BRAZING

Production. Production Brazing, B. Heyman. Welding Engr., vol. 9, nos. 3, 5 and 6, Mar., May, and June 1924, pp. 19–21, 19–21 and 17–20, 9 figs. Underlying principles. Description of devices and methods employed in carrying through a series of machine-brazing operations on a single product in which numerous difficulties were encountered both from an engineering standpoint in design and also from operating standpoint in shop.

C

CABLES, HOISTING

Dynamic-Stress Determination. Dynamic Stress of Winding Cables (Die dynamische Beanspruchung der Förderseile), G. Berg. Glückauf, vol. 60, no. 20, May 17, 1924, pp. 4004–02, 8 figs. Describes instruments for measuring and recording width between guides, also processes and trials for determining dynamic forces acting on cables.

CABLEWAYS

Aerial. Cableways and Suspended Railways (Schwebende Drahtseilbahnen und Schienenhängebahnen), M. Buhle. Bautechnik, vol. 2, no. 26, June 17, 1924, pp. 268–288, 88 figs. Describes and illustrates number of types manufactured by A. Bleichert & Co., Leipzig, for passengers and freight, on land and water, and installed in various parts of world.

Coal-Mine. Aerial Wire Ropeways, J. W. White. Instn. Min. Engrs.—Trans., vol. 67, Pt. 2, May 1924, pp. 114–128, 13 figs. Details of different types designed principally for colliery purposes.

Electric Suspension. Details of Electric Suspension Railways (Einzelheiten der Elektrohängebahnen), P. Stephan. Zeit. des Vereines deutscher Ingenieure, vol. 68, no. 28, June 7, 1924, pp. 606–609, 11 figs. Discusses modern examples of rails, switches and cars.

CAMERAS

Photographing Moving Projectiles. A Camera for Studying Projectiles in Flight, H. L. Curtis, W. H. Wadleigh and A. H. Sellman. U. S. Bur. Standards, Technologic Papers, No. 255, Mar. 19, 1924, pp. 189–202, 10 figs. partly on supp. plates. Describes camera which will take pictures of objects moving with high speed, and also measure their velocity. Number of pictures depends on number of lenses, 50 pictures per second per lens being easily obtained.

CAR LIGHTING

Equipment. Report of Committee on Locomotive and Car Lighting, W. E. Dunham. Ry. Age (Daily Edition), vol. 76, no. 32, June 14, 1924, pp. 1558–1560, 3 figs. Discusses design of axle-generator belt drive and photometry of locomotive headlights. Report presented before Am. Ry. Assn.

CAR WHEELS

Chilled-Iron. The Chilled Iron Wheel in Railroad Service, E. Ruker. Assn. Chinese & Am. Engrs.—Jl., vol. 5, no. 3, Mar. 1924, pp. 11–16. Evolution, production, and use of this special kind of wheel, and its action in service.

Rolled-Steel. The Manufacture of Solid Rolled Steel Car Wheels, G. A. Richardson. Ry. Club Pittsburgh—Official Proc., vol. 23, no. 5, Mar. 27, 1924, pp. 119–124 and (discussion) 124–126. Factors influencing delivery times and determining extra costs.

Specifications. Report of Committee on Wheels. Ry. Rev., vol. 74, no. 25, June 21, 1924, pp. 1211–1213, 3 figs. Cooling of rolled-steel wheels; specifications for cast-iron and steel wheels; development of cast-iron wheel design; wheel mounting gage; standard steel-wheel gage; tread-worn hollow wheels; grinding of cast-iron wheels. Report presented to Am. Ry. Assn. See also Ry. Age (daily edition), vol. 76, no. 36, June 19, pp. 1730–1735 and (discussion) pp. 1734–1737, 3 figs.

CARS, FREIGHT

Design. Report of the Committee on Car Construction. Ry. Age (Daily Edition), vol. 76, no. 34, June 17, 1924, pp. 1634–1638 (including discussion), 1 fig. Reviews objects of fundamentals of design adopted by Association prior to development of present standard box-car designs; development of theoretical basis of car-framing design. Report presented to Am. Ry. Assn. See also Ry. Rev., vol. 74, no. 25, June 21, 1924, pp. 1186–1189, 1 fig.

Scrapping. Scrapping Steel Freight Cars. Welding Engr., vol. 9, no. 6, June 1924, pp. 21–23, 5 figs. Application of electric-arc cutting process to reclaiming and scrapping of rolling stock.

Standard, Pennsylvania R. R. Pennsylvania Exhibits Standard Cars. Ry. Age (Daily Edition), vol. 76, no. 34, June 17, 1924, pp. 1661–1663, 4 figs. Double-sheathed box and automobile cars among exhibits; single-sheathed frame finished for stock loading.

CARS, PASSENGER

History and Development. History and Development of Passenger Car Building, Geo. A. Richardson. Ry. Rev., vol. 74, no. 24, June 14, 1924, pp. 1133–1141, 26 figs. Account of history and present facilities of Bethlehem Shipbldg. Corp., Wilmington, Del., which was pioneer in manufacture of passenger cars.

CARS, TANK

Specifications. Report of Committee on Tank Cars. Ry. Age (Daily Edition), vol. 76, no. 35, June 18, 1924, pp. 1675–1680 and (discussion) 1680–1684, 3 figs. Specifications for Class V and VI tank cars; report on dome covers, bottom-discharge outlets, etc. Report of committee before Am. Ry. Assn. See also Ry. Rev., vol. 74, no. 25, June 21, 1924, pp. 1175–1177, on committee specifications for Class VI tank cars for transportation of helium gas.

CASE-HARDENING

Steel. The Case-hardening of Steel, R. N. Richardson. Eng. Production, vol. 7, no. 142, July 1924, pp. 214–215. Discusses heat treatment of case-hardened steel, methods for preventing carburizing of parts, case-hardening compounds, and causes of failure of case-hardened parts.

CAST IRON

Graphite Formation in. The Formation of Graphite in Cast Iron, L. Northcott. Foundry Trade Jl., vol. 29, nos. 409 and 410, June 19 and 26, 1924, pp. 515–521 and (discussion) 548–550, 37 figs. Describes work undertaken in order to examine process. Effect of annealing white cast iron at different temperatures and under such conditions as to produce temper-carbon or nodular graphite. Observations regarding precipitation of carbon. Experiments on a typical gray cast iron of good quality to determine mechanism of formation of flaky or primary graphite as commonly found in gray irons.

Gray, Liquid Contraction in. The Problem of the Liquid Contraction in Grey Cast Iron, R. Buchanan. Foundry Trade Jl., vol. 29, no. 411, July 3, 1924, pp. 11–12. Review of subject.

CENTRAL STATIONS

Europe. Central Station Practice in Europe, B. G. Jamieson. West. Soc. Engrs.—Jl., vol. 29, no. 6, June 1924, pp. 247–256, 5 figs. Some noticeable differences in electrical engineering practice including use of mercury-arc rectifiers in place of converters, high-voltage direct current and lack of interconnection of networks, extensive use of underground cable. Attention is given to appearance of central-station buildings and surroundings.

Heat Balance. Heat Balance at Hudson Avenue Station (Brooklyn). Power Plant Eng., vol. 28, no. 13, July 1, 1924, pp. 706–709, 3 figs. Six sources of heat are involved in cycle; control is automatic; vertical isolation of phases is feature of electrical design.

Tri-Cities, Iowa. 150,000-Kw. Plant for the Tri-Cities (Iowa). Power Plant Eng., vol. 28, no. 13, July 1, 1924, pp. 726–728, 4 figs. Main turbine unit to be bled at four stages, three for stage feedwater heating and one for evaporator.

Wabash River Plant, Indiana. Mine Mouth Plant in Indiana Just Put in Service. Power Plant Eng., vol. 28, no. 13, July 1, 1924, pp. 682–692, 10 figs. Wabash River plant of Indiana Elec. Corp. transmits energy at 132,000 volts 75 mi. to Indianapolis for distribution; summary of mechanical equipment.

CHAINS

Connecting Links, Pulling Tests of. Results of Pulling Tests of Chain Connecting Links (Mededeeling omtrent de resultaten van trekproeven met sluitings), I. R. Mulder. Ingenieur, vol. 39, no. 20, May 17, 1924, pp. 364–369, 8 figs. Photographs, diagrams and tables of test results for chain connecting links of various sizes, pin diameters varying from 1/4 in. to 2 in.

CHIMNEYS

Design. The Design of Chimneys, W. S. Findlay. Power Engr., vol. 19, no. 219, June 1924, pp. 226–228, 5 figs. Factors in design of chimney shafts, with special reference to their stability.

Flue. Chimneys for Heating Boilers, A. G. King. Domestic Eng. (Chicago), vol. 106, no. 7, Feb. 16, 1924, pp. 20–23, 5 figs. Elements of a chimney flue and its proper position and construction.

CHROMIUM

Uses and Alloys. Chromium—Its Uses and Its Alloys, W. M. Mitchell. Forging—Stamping—Heat Treating, vol. 10, nos. 3 and 6, May and June, 1924, pp. 199–202 and 235–238, 7 figs. May: Sources of chromium, chemical properties and technical uses. June: Ferrochromium; chromium steels.

CLUTCHES

Conical. Conical Clutch Designs, A. Clegg. Machy. (N. Y.), vol. 30, no. 11, July 1924, pp. 867–869, 5 figs. Advantages of conical clutches; construction of conical clutch for radial drilling machine; principles to be followed in design; conical clutch for lathe feed control and applied to planer drive.

Friction. Considerations in Clutch Design, A. Clegg. Machy. (Lond.), vol. 24, no. 612, June 19, 1924, pp. 363–367, 6 figs. Deals with friction clutches and expanding and contracting ring clutches.

COAL

Carbonization. Practical Coal Carbonization, A. R. Powell. Mech. Eng., vol. 46, no. 7, July 1924, pp. 389–394, 6 figs. Enumeration of technical problems of low-temperature carbonization and classification and description of the various processes.

COAL HANDLING

Plants. Coal and Ore Handling Plant at Waalhaven, Rotterdam. Engineer, vol. 137, no. 3574, June 27, 1924, pp. 722–725, 8 figs. Details of installation of Coal Trading Assn. which, when completed, will comprise two quays 350 m. long, with accommodation for ocean-going vessels up to 10 m. draft, and between quays a dock 160 m. long available for river vessels with drafts up to 6 m.; description of transporter bridges, and transformer and load-equalizing station.

COMBUSTION

Control. Combustion Control Based on CO_2 in Gas, G. E. Gaster. Power Plant Eng., vol. 28, no. 14, July 15, 1924, pp. 768–769, 2 figs. Variations in CO_2 operate rheostat controlling speed of fan motor.

The Evils of Close Regulation in Automatic Combustion Control, T. A. Peebles. Power, vol. 60, no. 1, July 1, 1924, pp. 13–14. Points out that close regulation is desirable from viewpoint of production or utilization; on other hand, it tends to introduce wear, hunting or surging, and other undesirable conditions; this is particularly true of combustion-control apparatus, as herein described.

COMPRESSED AIR

Machinery. Air Machinery, A. Hinz. Mech. Eng., vol. 46, no. 7, July 1924, p. 417. Possibilities of improvements in compressed-air plant operation. Translated and abstracted from Glückauf, nos. 15 and 16, Apr. 12 and 19, 1924.

CONDENSERS, STEAM

Evaporative. The Evaporative Condenser, N. E. Webster. Instn. Min. Engrs.—Trans., vol. 67, Pt. 2, May 1924, pp. 192–198, 3 figs. Description of conditions for which this type of condenser seems peculiarly suitable.

Tubes. Condenser Tubes Pulled in Record Time. Power, vol. 59, no. 26, June 24, 1924, pp. 1032–1033, 5 figs. Special devices facilitate removal of 6000 plugs and 9000 tubes from large surface condenser.

CONVEYORS

Flour Mills. Conveying Apparatus in Flour Mills, Their Construction, Efficiency and Power Requirements (Die Fördervorrichtungen in Mühlen, deren Konstruktion, Leistungsfähigkeit und Kraftbedarf), F. Baumgarten. Fördertechnik u. Frachtverkehr, vol. 17, no. 11, June 3, 1924, pp. 153–155. Discusses development of conveying in connection with automatic grinding, conveying of flour in bulk and in sacks, ascending and descending conveyors, etc.

Pneumatic. Experimental Investigation of Pneumatic Conveying Process (Die experimentelle Untersuchung des pneumatischen Fördervorganges), M. Gasterstädt. Zeit. des Vereines Deutscher Ingenieure, vol. 68, no. 24, June 14, 1924, pp. 617–624, 22 figs. Describes experimental plant and measuring arrangements. Effect of quantity conveyed and velocity on pressure drop in conveying system; shows uniform connection between quantity conveyed and drop in pressure, and between velocity of air current and of material.

Shaking-Chute. Conveying by Shaking Chute and the Acceleration Process by Marcus (Die Schüttelrutschenförderung und das Beschleunigungsverfahren von Marcus), O. Ohnesorge. Fördertechnik u. Frachtverkehr, vol. 17, no. 11, June 3, 1924, pp. 150–153, 5 figs. Discusses deviation of angle, intercallation of inclined planes, curved conveyor paths, etc.

COPPER ALLOYS

Hardness. The Variation in Hardness of Copper Alloys with Temperature (La variation de la dureté des alliages de cuivre avec la température), L. Guillet. Revue de Métallurgie, vol. 21, no. 5, May 1924, pp. 295–302, 7 figs. Results of tests show that variations of hardness with temperature follow laws which vary considerably for alloys of same category; but in same range of thermal diagram, variations follow same laws to great extent; ternary alloys conserve their hardness better than binary alloys.

CORE BOXES

Valves. Making Globe Valve Corebox, W. C. Ewalt. Foundry, vol. 52, no. 12, June 15, 1924, pp. 483–485, 15 figs. Metal boxes are cast from carefully constructed wood master patterns where foundry output is large; in many cases pattern is built up from number of small segments.

CORES

Oil-Sand. The Technical Side of Oil-Sand Cores, C. W. H. Holmes. Foundry Trade Jl., vol. 29, no. 410, June 26, 1924, pp. 543–547. Selection of suitable sand and oil, preparation of core mixture, baking of oil-sand cores, and description of finished core.

Supports for. Core and Mould Supports, B. Shaw and J. Edgar. Mech. Wld., vol. 75, nos. 1942 and 1945, Mar. 21 and Apr. 11, 1924, pp. 178–179 and 229–230, 17 figs. Information regarding core and mold grids.

COST ACCOUNTING

Wastage in Relation to. The Wastage of Industrial Plant in Relation to Cost Accounting, A. Stewart. World Power, vol. 1, no. 6, June 1924, pp. 318–324, 4 figs. Nature of wastage; methods of measuring depreciation; plant register; cost of additions; repairs and renewals; inclusion of plant register.

COTTON

Breaking Load of. The Effect of Treatment with Sulphuric Acid on the Breaking Load of Cotton, P. D. Vincent. Textile Inst.—Jl., vol. 15, no. 5, May 1924, pp. T281–T290, 7 figs. Effect of treatment with sulphuric acid of various concentrations at room temperature on breaking load of cotton hairs and yarns has been actually measured; kier boiling increases breaking load of untreated yarn but still further weakens weaker acid-treated yarns.

CRANES

Industrial. Devices for Grappling Loads for Cranes (Die Lastaufnahmemittel der Krane), R. Hänchen. Maschinenbau, vol. 3, no. 16, May 22, 1924, pp. 567–575, 31 figs. Discusses conveying apparatus for bulk goods; describes types of grabs, tipples, etc.

Jib. "Toplis" Luffing Cranes at Southampton Docks. Engineering, vol. 117, no. 3050, June 13,

Manufactured by Advertisers — CLASSIFIED LIST OF MECHANICAL EQUIPMENT — Alphabetical List on page 148

Conveying Systems, Powdered Coal
Grindle Fuel Equipment Co.

Conveyor Systems, Pneumatic
* Allington & Curtis Mfg. Co.
* Sturtevant, B. F. Co.

Conveyors, Belt
* Brown Hoisting Machinery Co.
Chain Belt Co.
Gandy Belting Co.
* Gifford-Wood Co.
Link-Belt Co.

Conveyors, Bucket, Pan or Apron
* Brown Hoisting Machinery Co.
Chain Belt Co.
* Gifford-Wood Co.
* Jones, W. A. Fdry. & Mach. Co.
Link-Belt Co.

Conveyors, Chain
* Brown Hoisting Machinery Co.
Chain Belt Co.
Link-Belt Co.

Conveyors, Ice
Chain Belt Co.
* Gifford-Wood Co.
Link-Belt Co.

Conveyors, Portable
* Gifford-Wood Co.
Link-Belt Co.

Conveyors, Screw
Chain Belt Co.
* Gifford-Wood Co.
Link-Belt Co.

Cooling Ponds, Spray
* Cooling Tower Co. (Inc.)
* Schutte & Koerting Co.

Cooling Towers
* Burhorn, Edwin Co.
* Cooling Tower Co. (Inc.)
* Wheeler, C. H. Mfg. Co.
* Wheeler Condenser & Engrg. Co.
* Worthington Pump & Machinery Corp'n

Copper, Drawn
* Roebling's, John A. Sons Co.

Copper Converting Machinery
* Allis-Chalmers Mfg. Co.
* Worthington Pump & Machinery Corp'n

Counters, Revolution
* American Schaeffer & Budenberg Corp'n
* Ashton Valve Co.
* Bristol Co.
* Crosby Steam Gage & Valve Co.
Veeder Mfg. Co.

Countershafts
* Builders Iron Foundry
Hill Clutch Machine & Fdry. Co.
* Royersford Fdry. & Mach. Co.
* Wood's, T. B. Sons Co.

Couplings, Pipe
Byers, A. M. Company
* Central Foundry Co.
* Crane Co.
Lunkenheimer Co.

Coupling, Shaft (Flexible)
* Allis-Chalmers Mfg. Co.
* Brown, A. & F. Co.
* Falk Corporation
* Fawcus Machine Co.
* Foote Bros. Gear & Machine Co.
Hill Clutch Machine & Fdry. Co.
* Jones, W. A. Fdry. & Mach. Co.
* Medart Co.
* Nordberg Mfg. Co.
Nuttall, R. D. Co.
* Smith & Serrell

Coupling, Shaft (Rigid)
* Allis-Chalmers Mfg. Co.
* Brown, A. & F. Co.
Chain Belt Co.
Cumberland Steel Co.
* Falls Clutch & Machinery Co.
Farrel Foundry & Machine Co.
* General Electric Co.
Hill Clutch Machine & Fdry. Co.
* Jones, W. A. Fdry. & Mach. Co.
Link-Belt Co.
* Medart Co.
* Royersford Fdry. & Mach. Co.
* Smith & Serrell
* Wood's, T. B. Sons Co.

Couplings, Universal Joint
* Wood's, T. B. Sons Co.

Coverings, Steam Pipe
Carey, Philip Co.
Johns-Manville (Inc.)

Cranes, Electric Traveling
Palmer-Bee Co.
* Whiting Corporation

Cranes, Floor (Portable)
Lidgerwood Mfg. Co.

Cranes, Gantry
* Brown Hoisting Machinery Co.
Link-Belt Co.
* Whiting Corp'n

Cranes, Hand Power
* Brown Hoisting Machinery Co.
Clyde Iron Works Sales Co.
Palmer-Bee Co.
* Whiting Corp'n

Cranes, Jib
* Brown Hoisting Machinery Co.
Palmer-Bee Co.
* Whiting Corp'n

Cranes, Locomotive
* Brown Hoisting Machinery Co.
Link-Belt Co.

Cranes, Locomotive (Crawler)
Link-Belt Co.

Cranes, Pillar
* Brown Hoisting Machinery Co.
* Whiting Corp'n

Cranes, Portable
* Brown Hoisting Machinery Co.
Clyde Iron Works Sales Co.
Link-Belt Co.

Crucibles, Graphite
Dixon, Joseph Crucible Co.

Crushers, Clinker
Farrel Foundry & Machine Co.

Crushers, Coal
* Allis-Chalmers Mfg. Co.
* Brown Hoisting Machinery Co.
* Gifford-Wood Co.
Link-Belt Co.
Pennsylvania Crusher Co.
* Smidth, F. L. & Co.
* Worthington Pump & Machinery Corp'n

Crushers, Hammer
Pennsylvania Crusher Co.

Crushers, Jaw
Farrel Foundry & Machine Co.
* Worthington Pump & Machinery Corp'n

Crushers, Ore and Rock
Farrel Foundry & Machine Co.
* Nordberg Mfg. Co.
Pennsylvania Crusher Co.

Crushers, Roll
Link-Belt Co.
Pennsylvania Crusher Co.
* Worthington Pump & Machinery Corp'n

Crushing and Grinding Machinery
* Allis-Chalmers Mfg. Co.
Farrel Foundry & Machine Co.
Pennsylvania Crusher Co.
* Smidth, F. L. & Co.
* Worthington Pump & Machinery Corp'n

Cupolas
* Bigelow Co.
* Whiting Corp'n

Cutters, Bolt
* Landis Machine Co. (Inc.)

Cutters, Milling
* Whitney Mfg. Co.

Dehumidifying Apparatus
* American Blower Co.
* Carrier Engineering Corp'n

Derricks and Derrick Fittings
Clyde Iron Works Sales Co.
Lidgerwood Mfg. Co.

Desaturators
* United Machine & Mfg. Co.

Diaphragms, Rubber
* United States Rubber Co.

Die Castings
(See Castings, Die Molded)

Die Heads, Thread Cutting (Self-opening)
* Jones & Lamson Machine Co.
* Landis Machine Co. (Inc.)

Dies, Punching
* Niagara Machine & Tool Works

Dies, Sheet Metal Working
* Niagara Machine & Too Works

Dies, Stamping
* Niagara Machine & Tool Works

Dies, Thread Cutting
* Jones & Lamson Machine Co.
* Landis Machine Co. (Inc.)

Diesel Engines
(See Engines, Oil, Diesel)

Digesters
* Bigelow Co.

Distilling Apparatus
* Vogt, Henry Machine Co.

Drafting Room Furniture
Dietzgen, Eugene Co.
Economy Drawing Table & Mfg. Co.
Keuffel & Esser Co.

Drafting Room Furniture
New York Blue Print Paper Co.
ParVell Laboratories
U. S. Blue Co.
Weber, F. Co. (Inc.)

Drawing Instruments and Materials
Dietzgen, Eugene Co.
Keuffel & Esser Co.
New York Blue Print Paper Co.
ParVell Laboratories
U. S. Blue Co.
Weber, F. Co. (Inc.)

Dredges, Hydraulic
* Morris Machine Works

Dredging Machinery
Lidgerwood Mfg. Co.
* Morris Machine Works

Dredging Sleeve
* United States Rubber Co.

Drilling Machines, Sensitive
* Royersford Fdry. & Mach. Co.

Drilling Machines, Vertical
* Royersford Fdry. & Mach. Co.

Drills, Coal and Slate
* General Electric Co.
* Ingersoll-Rand Co.

Drills, Core
* Ingersoll-Rand Co.

Drills, Rock
* General Electric Co.
* Ingersoll-Rand Co.

Drinking Fountains, Sanitary
Johns-Manville (Inc.)

Dryers, Coal
Grindle Fuel Equipment Co.

Dryers, Rotary
* Bigelow Co.
Farrel Foundry & Machine Co.
Link-Belt Co.
* Sturtevant, B. F. Co.

Drying Apparatus
* American Blower Co.
* Carrier Engineering Corp'n
* Clarage Fan Co.
* Sturtevant, B. F. Co.

Dust Collecting Systems
* Allington & Curtis Mfg. Co.
* Allis-Chalmers Mfg. Co.
* Clarage Fan Co.
* Sturtevant, B. F. Co.

Dust Collectors
* Allington & Curtis Mfg. Co.
* Allis-Chalmers Mfg. Co.
* Sturtevant, B. F. Co.

Dynamometers
* American Schaeffer & Budenberg Corp'n
* General Electric Co.
* Wheeler, C. H. Mfg. Co.

Economizers, Fuel
* Green Fuel Economizer Co.
* Power Specialty Co.
* Sturtevant, B. F. Co.

Ejectors
* Schutte & Koerting Co.

Electrical Machinery
* Allis-Chalmers Mfg. Co.
* General Electric Co.
* Westinghouse Electric & Mfg. Co.

Electrical Supplies
* General Electric Co.
Johns-Manville (Inc.)

Elevating and Conveying Machinery
* Brown Hoisting Machinery Co.
Chain Belt Co.
* Gifford-Wood Co.
* Jones, W. A. Fdry. & Mach. Co.
Link-Belt Co.
Palmer-Bee Co.

Elevators, Bucket & Chain
Gandy Belting Co.

Elevators, Hydraulic
* Whiting Corp'n

Elevators, Pneumatic
* Whiting Corp'n

Elevators, Portable
* Gifford-Wood Co.
Link-Belt Co.

Elevators, Telescopic
Link-Belt Co.

Emery Wheel Dressers
* Builders Iron Foundry

Engine Repairs
* Franklin Machine Co.
* Nordberg Mfg. Co.

Engine Stops
Golden-Anderson Valve Specialty Co.
* Schutte & Koerting Co.

Engines, Blowing
* Allis-Chalmers Mfg. Co.
Mackintosh-Hemphill Co.
* Nordberg Mfg. Co.
* Worthington Pump & Machinery Corp'n

Engines, Gas
* Allis-Chalmers Mfg. Co.
* De La Vergne Machine Co.
* Ingersoll-Rand Co.
* Titusville Iron Works Co.
* Westinghouse Electric & Mfg. Co.

Engines, Gasoline
* Sturtevant, B. F. Co.
* Titusville Iron Works Co.
* Worthington Pump & Machinery Corp'n

Engines, Hoisting
* Allis-Chalmers Mfg. Co.
Clyde Iron Works Sales Co.
Lidgerwood Mfg. Co.
* Morris Machine Works
* Nordberg Mfg. Co.

Engines, Kerosene
* Worthington Pump & Machinery Corp'n

Engines, Marine
Bethlehem Shipbldg.Corp'n(Ltd.)
* Ingersoll-Rand Co.
Johnson, Carlyle Machine Co.
* Nordberg Mfg. Co.
* Sturtevant, B. F. Co.
* Worthington Pump & Machinery Corp'n

Engines, Marine, Oil
Bethlehem Shipbldg.Corp'n(Ltd.)
* Ingersoll-Rand Co.
* Nordberg Mfg. Co.

Engines, Marine, Steam
Bethlehem Shipbldg.Corp'n(Ltd.)
* Nordberg Mfg. Co.

Engines, Oil
* Allis-Chalmers Mfg. Co.
Bethlehem Shipbldg.Corp'n(Ltd.)
* De La Vergne Machine Co.
* Ingersoll-Rand Co.
* Nordberg Mfg. Co
* Titusville Iron Works Co.
* Worthington Pump & Machinery Corp'n

Engines, Oil, Diesel
* Allis-Chalmers Mfg. Co.
Bethlehem Shipbldg.Corp'n(Ltd.)
* Nordberg Mfg. Co.
* Worthington Pump & Machinery Corp'n

Engines, Pumping
* Allis-Chalmers Mfg. Co.
* Ingersoll-Rand Co.
* Morris Machine Works
* Nordberg Mfg. Co.
* Worthington Pump & Machinery Corp'n

Engines, Steam
* Allis-Chalmers Mfg. Co.
* American Blower Co.
Bethlehem Shipbldg.Corp'n(Ltd.)
* Clarage Fan Co.
Clyde Iron Works Sales Co.
* Cole, R. D. Mfg. Co.
* Engberg's Electric & Mech. Wks.
* Erie City Iron Works
* Harrisburg Fdry. & Mach. Wks.
* Ingersoll-Rand Co.
* Leffel, James & Co.
Lidgerwood Mfg. Co.
Mackintosh-Hemphill Co.
* Morris Machine Works
* Nordberg Mfg. Co.
Ridgway Dynamo & Engine Co.
* Skinner Engine Co.
* Sturtevant, B. F. Co.
* Titusville Iron Works Co.
* Troy Engine & Machine Co.
* Vilter Mfg. Co.
* Westinghouse Electric & Mfg. Co.
* Wheeler, C. H. Mfg. Co.

Engines, Steam, Automatic
* American Blower Co.
* Clarage Fan Co.
* Engberg's Electric & Mech. Wks.
* Erie City Iron Works
* Harrisburg Fdry. & Mach. Wks
* Leffel, James & Co.
Ridgway Dynamo & Engine Co.
* Skinner Engine Co.
* Sturtevant, B. F. Co.
* Troy Engine & Machine Co.
* Westinghouse Electric & Mfg. Co.

Engines, Steam, Corliss
* Allis-Chalmers Mfg. Co.
* Franklin Machine Co.
* Frick Co. (Inc.)
* Harrisburg Fdry. & Mach. Wks.
Mackintosh-Hemphill Co.
* Nordberg Mfg. Co.
* Vilter Mfg. Co.

*Catalogue data of firms marked * appear in the A.S.M.E. Condensed Catalogues of Mechanical Equipment, 1923-24 Volume*

1924, pp. 762–763, 4 figs. partly on p. 768. Patent horizontal-luffing type, consisting of traveling truck, in which is mounted a rotating steel lattice structure, forming a mast and carrying jib and combined machinery house and operator's cabin.

Traveling. Materials-Handling Equipment of the New Docks of Cambrai, France (Les appareils de manutention mécanique des nouveaux docks de Cambrai). Génie Civil, vol. 84, no. 22, May 31, 1924, pp. 513–516, 7 figs. Traveling cranes for transportation of sugar in sacks.

Monorail Traveling Crane. Min. & Oil Bul., vol. 10, no. 7, July 1924, pp. 717–719, 2 figs. Describes overhead crane and monorail system located at plant of Chanslor-Canfield Midway Oil Co. Crane requires only half usual amount of trackage and makes transfer of large and heavy articles such as beams, pipes, lathes and engines, very simple.

Standard Traveling Cranes (Normale Dampfkrane), W. Benedict. Maschinenbau, vol. 3, no. 16, May 22, 1924, pp. 576–577, 1 fig. Discusses construction of steam slewing cranes, especially control services; adaptability for many purposes.

CRANKSHAFTS

Failures. Stress Distribution in Crankshafts and Its Relation to Crankshaft Failures, D. J. McAdam, Jr. and G. F. Wohlgemuth. Am. Soc. Naval Engrs.—Jl., vol. 36, no. 2, May 1924, pp. 244–281, 29 figs. Causes of crankshaft failures; stress distribution in crankshafts as affected by restraint of journals; stress-strain relationship in typical naval crankshafts; measured and calculated angular deflections of Liberty crankshaft; typical crankshaft failures; desirable stress distribution in crankshafts.

Machining. Machining Automobile Crankshafts, W. E. Groene. Machy. (N. Y.), vol. 30, no. 11, July 1924, pp. 855–858, 4 figs. New manufacturing method involving use of automatic crankshaft lathe in conjunction with multi-cut lathe.

CUPOLAS

Experimental Results. The Dimensions of Cupolas, Their Relation to Volume of Coke and Iron Charges and Their Influence on Melting Process and Coke Consumption (Die Abmessungen der Kuppelöfen, ihr Verhältnis zur Grösse der Koks- und Eisensätze und ihr Einfluss auf Schmelzgang und Koksverbrauch), A. Wagner. Stahl u. Eisen, vol. 44, no. 22, May 29, 1924, pp. 617–622, 1 fig. Results of experiments on two larger cupolas and one smaller one.

Fuel Economy. Economical Melting with Cupolas, H. Van Aarst. Foundry Trade Jl., vol. 29, no. 409, June 19, 1924, pp. 522–524, 3 figs. How to be economical with fuel in cupola. Influence of iron on fuel economy, influence of mechanical properties of coke, air supply, and cupola linings. See also Foundry, vol. 52, no. 13, July 1, 1924, pp. 514–515, 3 figs.

Waste Utilization. Operating Experience with the Grau Iron and Coke Recovery Machine (Betriebserfahrungen mit der Graueschen Eisen- und Koks-Rückgewinnungsmaschine), M. Kupper. Giesserei Zeitung, vol. 21, no. 11, June 1, 1924, pp. 223–225 Discusses possible applications of machine, results of operations, profit and loss. Describes tests with cupola furnace, and foundry and other wastes.

CYLINDERS

Locomotive, Welding of. Locomotive Cylinder Welding, J. S. Heaton. Welding Engr., vol. 9, no. 6, June 1924, pp. 24–25, 10 figs. Firepot made of front end netting greatly reduces cost of preheating cylinders; special preheating torch.

D

DIESEL ENGINES

Fuel Injection. Investigation of the Fuel-Injection Process in Diesel Engines (Untersuchungen über den Einspritzvorgang bei Dieselmaschinen), W. Riehm. Zeit. des Vereines Deutscher Ingenieure, vol. 68, no. 25, June 21, 1924, pp. 641–645, 10 figs. Discusses fundamentals of injection process; describes experimental plant, tests with water and oil, absorption of heat up to ignition.

Low-Powered. Low-Powered Diesel Engines (La question du Diesel de faible puissance), P. Simondet. Arts & Métiers, vol. 77, no. 42, Mar. 1924, pp. 81–105, 22 figs. Deals with technical, financial and manufacturing problems of low-power engines working on Diesel cycle, with special reference to difficulties which may account for comparatively restricted extent to which they have hitherto been employed; among types of engines described are Hindl and Hvid engines.

Smit-M.A.N. A New Dutch Diesel Engine Mar. Engr. & Motorship Bldr., vol. 47, no. 562, July 1924, pp. 265–266, 5 figs. J. & K. Smit of Kinderdijk, Holland, have commenced manufacture of M. A. N. Diesel engines. Particulars of unit recently completed, 3-cylinder 60-b. hp. M. A. N. 4-stroke Diesel engine.

Sulzer. A New Sulzer Engine with Independent Scavenging. Mar. Engr. & Motorship Bldr., vol. 47, no. 562, July 1924, pp. 267–268 and 270, 2 figs. Particulars of first Diesel engine constructed by Wallsend Slipway & Eng. Co.; Sulzer 4-cylinder unit of 2000 b.hp.

DRILLING MACHINES

Angle-Plate Fixture. Universal Angle-plate Drilling Fixture. Machy. (Lond.), vol. 24, no. 610, June 5, 1924, pp. 315–316, 3 figs. Use and general application of universal drilling fixture for handling casings for turbines.

Radial. New 6-ft. Radial Drilling Machine. Machy. (Lond.) vol. 24, no. 610, June 5, 1924, pp. 305–306, 1 fig. High-speed radial drilling, boring, facing, tapping, and studding machine, constructed by Geo. Swift & Sons, Halifax.

DROP FORGING

Crankshafts. Precautions Needed in Production of Automotive Drop Forgings. Automotive Industries, vol. 50, no. 26, June 26, 1924, pp. 1388–1391, 6 figs. Wyman-Gordon employ special machine to prove running balance of crankshafts and etch section to show direction of flow in finished product, in addition to standard tests.

DRYING

Methods. Drying Methods in Modern Industrial Processes, Chas. L. Hubbard. Nat. Engr., vol. 28, no. 7, July 1924, pp. 309–314, 7 figs. Fundamentals of drying processes and basic factors affecting their operation.

E

EDUCATION, ENGINEERING

Courses. Engineering Courses for the Functional Rather than the Industrial Divisions of Engineering, E. Bennett. Eng. Education, vol. 14, no. 10, June 1924, pp. 582–599. Functional divisions of engineering are considered to be functional divisions found within any of the large industrial organizations.

Leaders and Routine Practitioners. Educating Leaders and Routine Practitioners, C. C. Williams. Eng. Education, vol. 14, no. 9, May 1924, pp. 528–535. Considers question of whether colleges can effectively train both leaders and routine practitioners simultaneously.

Tabulated Recapitulations, Use of. Tabulated Recapitulations as a Means of Education, P. A. Cushman. Eng. Education, vol. 14, no. 8, Apr. 1924, pp. 450–458, 4 figs. Points out in what ways engineering students would gain by use of tabular recapitulations during their study of fundamental courses.

Teaching, Methods of. At What Are We Aiming and With What? F. W. Springer. Eng. Education, vol. 14, no. 10, June 1924, pp. 565–581. Proposes a key or outline of educational theory and makes more apparent desirability and possibility of finding cues for application of theory to engineering education.

ELECTRIC DRIVE

Group and Individual. When to Use Group and Individual Drives, R. W. Drake. Indus. Engr., vol. 82, nos. 2, 3 and 4, Feb., Mar. and Apr., 1924, pp. 56–60 and 106–107; 118–122; and 174–177, 15 figs. Comparative advantages and disadvantages of group and individual drives in industrial plants; points on layout, installation and operation; fan drives; line-shaft losses.

ELECTRIC FURNACES

Development. Electric Furnace Development, F. Hodson. Blast Furnace & Steel Plant, vol. 12, no. 7, July 1924, pp. 314–318, 8 figs. Many supposed limitations now being removed suggests unlimited growth.

Electrodes. The Use of Söderberg Self-Baking Electrodes in Electric Steel Furnaces (Die Verwendung der Söderbergschen Dauerelektrode an Elektrostahlöfen), W. Eilender and L. Lyche. Berichte der Fachausschüsse des Vereins deutscher Eisenhüttenleute, Stahlwerksausschuss, report no. 78, Jan. 30, 1924, 5 pp. Use of self-baking electrode in 6-ton Héroult furnace; results show decrease in use of electrodes per ton steel; reduction of current consumption per ton steel; reduction in production cost per ton electrodes.

Iron-Melting. Melts Iron in Twin Furnaces, A. W. Bryant. Foundry, vol. 52, no. 14, July 15, 1924, pp. 556–559, 4 figs. Two electric units mounted on turntable 180 deg. apart and having one set of electrodes, provide small batches of hot iron at short even intervals.

Metallic-Resistor. The Metallic Resistor in Industrial Heating Furnaces, E. F. Collins. Chem. & Met. Eng., vol. 30, nos. 24 and 25, June 16 and 23, 1924, pp. 936–941 and 981–985, 18 figs. Application and design of electrical heating equipment; comparison of types of resistors; advantages of furnace. Chemical, physical and economic laws governing use of equipment.

Steel. Some Applications of Electric Heat to the Reheating of Steel, E. F. Collins. Fuels & Furnaces, vol. 2. nos. 6 and 7, June and July 1924, pp. 575–578 and 655–660, 2 figs. Brief review of past and present day conceptions of heat and laws governing it. Metallic resistors in unmuffled furnaces.

ELECTRIC LOCOMOTIVES

Current-Generating System. Railway Electrication (Considerations sur l'electrification des chemins de fer), E. Stassano. Génie Civil, vol. 84, no. 20, May 17, 1924, pp. 472–475. Notes on Stassano system of generation of current on locomotive. Supplementary note is appended on observations on Stassano system of traction, setting forth its shortcomings.

Development. Development of the Electric Locomotive, F. H. Shepard. Ry. Age (Daily Edition), vol. 76, no. 32, June 14, 1924, pp. 1568–1579, 17 figs. History of development, with tabulation of practically every electric locomotive in world, built or under construction, showing wheel and cab arrangement of each type in diagram; advantages and disadvantages of each type of drive. Paper presented before Am. Ry. Assn.

German State Rys. Electric Locomotives with Special Reference to the Locomotives of the German Railways (Die elektrischen Lokomotiven unter besonderer Berücksichtigung der Lokomotiven der Deutschen Reichsbahn), M. Kleinow. Elektrotechnische Zeit., vol. 45, nos. 22 and 23, May 29 and June 5, 1924, pp. 547–553 and 583–588, 16 figs. Discusses a.c. locomotives of 15,000 volts and 16⅔ periods used for long distance traffic, their development and construction, and equipment.

Japanese. Electric Locomotives for the Imperial Government Railways of Japan. English Elec. Jl., vol. 2, no. 6, Apr. 1924, pp. 294–301, 9 figs. Particulars of the three types ordered, namely, local passenger, freight, and express passenger locomotives. All fitted with same motor, 306 hp., 750 volts.

Midi Railway, France. High-Speed Electric Traction (La traction électrique à grande vitesse), F. Broussouse. Technique Moderne, vol. 16, no. 9, May 1, 1924, pp. 324–328, 5 figs. New locomotives with vertical motors of the Midi Railway.

South African Ry. Electric Locomotives for South African Railway. Ry. Age, vol. 77, no. 2, July 12, 1924, pp. 53–56, 6 figs. Description of combined passenger and freight locomotives for Glencoe to Pietermaritzburg section. Three motive-power units are coupled together, driven in multiple, and controlled from one driver's cab. Maximum tractive force 40,000 lb.; traction system 3000 volts d.c.

Swiss. The I-C-I (2–6–2) Electric Locomotives of the Swiss Federal Railways, E. Savary. Int. Ry. Congress Assn.—Bul., vol. 6, no. 6, June 1924, pp. 457–461, 4 figs. Details of locomotive for express trains, having 6 driving wheels and 4 carrying wheels, weight in running order 60 tons, maximum speed 56 m.p.h.; single-phase traction. Translated from Bulletin Technique de la Suisse Romande.

Three-Phase. New Three-Phase Electric Locomotives of the Italian State Railways (I nuovi locomotori elettrici trifasi a 5 sale accoppiate delle FF.SS.), Amedeo Savoia. Rivista tecnica delle Ferrovie Italiane, vol. 25, no. 4, April 15, 1924, pp. 128–134, 1 fig. Details of new three-phase locomotive with five coupled axles (type Gr. E 551).

ELECTRIC WELDING

Boiler Tubes. The Repair of Boiler Tubes by Electric Welding (Réparation des tubes à fumée), Renaud. Revue Générale des Chemins de Fer & des Tramways, vol. 43, no. 5, May 1924, pp. 341–347, 7 figs. Methods and machinery employed at shops of Sotteville-les-Rouen, France.

Spot-Welding Machines. Reflex Action of Material to be Welded on Current and Tension Conditions of a Spot-Welding Machine (Rüchwirkung des Schweissgutes auf die Strom- und Spannungsverhältnisse der Punktschweissmaschine), F. H. Hellmuth. Elektrotechnische Zeit., vol. 45, no. 25, June 19, 1924, pp. 657–658, 3 figs. Tests with 15-kva. spot-welding machine as to effect of large masses of sheet iron, in form of plane or cylinder between electrodes.

ELEMENTS

Non-Metallic. The Non-Metallic Elements. Connections between their Dielectric and other Physical Properties, G. L. Addenbrooke. Lond., Edinburgh, & Dublin Philosophical Mag. & Jl. Sci., vol. 47, no. 281, May 1924, pp. 945–965, 1 fig. Consideration of two actions taking place when dielectric is placed in electric field; relation of attraction to energy reversibly stored; comparison of relative electric values found with relative values of other physical properties; comparison of electric actions with absolute melting points and with absolute boiling points; relation of relative molecular electric actions to heat of vaporization; relations with surface tensions; comparison with capillarity; etc.

ELEVATORS

Standards. Purpose of the S. I. A. Regulations for Construction and Operation of Elevators (Was bezwecken die S. I. A.-Vorschriften für Einrichtung und Betrieb von Aufzügen?), A. Bernheim, Jr. Schweizerische Bauzeitung, vol. 83, no. 24, June 14, 1924, pp. 280–284, 1 fig. Review of standards by S. I. A. commission, suggesting further improvements and more stringent regulations.

EMPLOYMENT MANAGEMENT

Personal-Interview Method. Pitfalls of the Employment Interview, D. A. Laird. Indus. Mgt. (N. Y.), vol. 68, no. 1, July 1924, pp. 58–62, 4 figs. Pitfalls of personal interview employment procedure, and suggestions for eliminating them.

EMPLOYEES, TRAINING OF

Railway, in Air-Brake Equipment. Instructing Railway Employes in Air Brake Equipment, J. P. Stewart. Ry. Rev., vol. 74, no. 24, June 14, 1924, pp. 1131–1132. Methods of interesting and instructing employees in operation and maintenance of air-brake equipment; value of instruction cars and instruction rooms; class instruction preferred. (Abstract.) Paper read before Air Brake Assn.

ENERGY

Transforming and Distributing. The Value of Efficiency in Transforming and Distributing Energy, Chas. E. Lucke. Mech. Eng., vol. 46, nos. 6 and 7, June and July 1924, pp. 317–324 and 380–385, 10 figs. Importance of energy costs; estimates of costs for primary energy and for its power-plant transformation into electrical energy through appropriate steps.

ENGINEERS

Responsibility of. The Engineer's Responsibility, M. Knowles. Engrs.' Soc. West. Pa.—Proc., vol. 40, no. 4, May 1924, pp. 143–158 and (discussion) 159–162. Definition of engineer; public influence of engineering work; distribution of responsibility; what engineer can do for himself; directing public opinion; etc.

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F

FIRE PREVENTION

Industrial Plants. Modern Maintenance of Plant and Equipment, W. G. Ziegler. Indus. Mgt. (N. Y.), vol. 68, no. 1, July 1924, pp. 6–13, 14 figs. Fire and accident prevention in industrial plants.

FIRES

Loss Statistics. Fire Loss Statistics for 1923. Fire & Water Eng., vol. 75, no. 25, June 18, 1924, pp. 1315–1317, 1319–1320, 1322–1323 and 1351. Tabulation showing number of alarms, number of fires in various types of buildings, how controlled, property values, losses, etc.

FLAX

Retting. An Experimental Study of Flax Retting, J. V. Eyre and C. R. Nodder. Textile Inst.—Jl., vol. 15, no. 5, May 1924, pp. T237–T272, 24 figs. Development of acidity during retting of flax: its interpretation and technical significance.

FLOW OF GASES

Aeration of Jet of Gas. The Entrainment of Air by a Jet of Gas issuing from a Small Orifice in a Thin Plate, J. S. G. Thomas. Lond., Edinburgh, & Dublin Philosophical Mag. & Jl. Sci., vol. 47, no. 281, May 1924, pp. 1048–1056, 4 figs. It is shown that constant value of aeration of jet of gas issuing at different pressures from orifice, as referred to in Technologic Paper no. 193 (1921) of Bur. of Standards, characterizes induction-flow system in which induction of air is effected under conditions such that flow of stream of air induced by jet is considerably reduced from its normal value in free air by restricting effective area of induction tube or otherwise.

FLUE-GAS ANALYSIS

CO Indicator. A New Instrument for the Continuous Indication of Carbon Monoxide in Boiler-Flue Gases, W. O. Andrews. S. African Instn. Engrs.—Jl., vol. 22, no. 10, May 1924, pp. 145–152 and (discussion) 152–153, 3 figs. Instrument devised by author as simple and inexpensive means of indicating, by means of color of liquid, presence or absence of small quantities of combustible carbon gases in flue gas.

CO_2 Recorders. Electrically Heated Platinum Tubes Used in CO_2 Recorder. Power Plant Eng., vol. 28, no. 13, July 1, 1924, pp. 729–730, 1 fig. In new recorder made by Uehling Instrument Co., Paterson, N. J., novel scheme is employed to secure motive power for actuating recorder by burning combustible in electrically heated platinum tubes.

FORGING

Stamping and, Equipment for. The Modern Forging and Stamping of Steel. Metal Industry (Lond.), vol. 24, nos. 25 and 26, and vol. 25, no. 1, June 20, 27 and July 4, 1924, pp. 605–606, 627–628 and 9–11. Survey of forging and stamping work, from questions of shop equipment and layout to causes of defective stampings and heat treatment considerations.

FOUNDRIES

Automobile. Metallurgical Control in Automobile Foundry Practice, A. Harley. Foundry Trade Jl., vol. 29, no. 395 and 396, Mar. 13 and 20, 1924, pp. 207–210 and 235–237, 19 figs. Modern conditions and tendencies; organization of labor conditions; discusses cast iron, semi-steel, malleable iron, and cast steel castings; molding sands; non-ferrous metals castings; production of a cast-iron cylinder.

The Foundry of the Sunbeam Motor Car Company. Foundry Trade Jl., vol. 29, no. 407, June 5, 1924, pp. 455–459, 11 figs. Particulars of equipment and methods employed.

Birmingham Exhibition, England. The International Foundry Trades' Exhibition. Foundry Trade Jl., vol. 29, nos. 409 and 410, June 19 and 26, 1924, pp. 502–508, 525–526, 528 and 530; and 557–542; 24 figs. Brief descriptions of exhibits at show being held at Birmingham, Eng., which cover general foundry plant, foundry requisites, patterns and patternmaking machinery and tools, molding sands, refractories, die-casting plant and laboratory equipment, raw materials, fuel and finished castings of all kinds. See also Metal Industry (Lond.), vol. 24, nos. 25 and 26, June 20 and 27, 1924, pp. 599–604 and 622–626, 24 figs.

Malleable-Iron. Operates New Malleable Foundry, E. C. Boehringer. Iron Trade Rev., vol. 75, no. 1, July 3, 1924, pp. 29–33, 6 figs. Describes plant, including equipment, and practice of Belle City Malleable Iron Co., Racine, Wis. See also Foundry, vol. 52, no. 13, July 1, 1924, pp. 521–526 and 533, 13 figs.

FUEL ECONOMY

Metallurgical Works. Works Problems and Methods in Fuel Economy, R. Hadfield. Iron & Coal Trades Rev., vol. 108, no. 2938, June 20, 1924, pp. 1066–1067. Certain problems met with in practice and some methods by which they may be attached; general considerations regarding heat balance; furnace efficiency; importance of high-temperature research, use of pyrometers, and temperature colors. Abstract of paper read before Iron & Steel Sec., Empire Min. & Met. Congress.

FUELS

Canadian Resources. Canada's Fuel Problem, C. Camsell. Combustion, vol. 11, no. 1, July 1924, pp. 46–50. Discussion of Canada's fuel resources and fuel requirements and of possibilities for eliminating uncertainties due to importation of fuel.

The Fuel Resources of Canada and Their Utilization for the Production of Power and Other Purposes, B. F. Haanel. Eng. Jl., vol. 7, no. 7, July 1924, pp. 361–382, 15 figs. Fuel resources; production, consumption, imports and exports; preparation of solid fuels for industrial and other uses; value of Canadian solid fuels for steam raising and production of a power and industrial gas; carbonization of peat, oil shales, and lower-grade coals and relation of carbonization of coals to production of power. Paper read at World Power Conference.

Combustion. An Investigation of the Maximum Temperatures and Pressures Attainable in the Combustion of Gaseous and Liquid Fuels, G. A. Goodenough and G. T. Felbeck. Univ. of Ill. Bul., Eng. Experiment Station, No. 139, Mar. 1924, 158 pp., 27 figs. Details of investigation to study conditions of equilibrium and establish necessary equilibrium equations, and to incorporate these equilibrium equations into a formulation by means of which maximum temperature resulting from combustion of a fuel under predetermined conditions may be calculated.

Gaseous. Theoretical Comparative Study of the Principal Gaseous Fuels from Viewpoints of Lighting and of Power Generation (Etude théorique comparée des principaux combustibles gazeux aux points de vue de l'éclairage et de la force motrice), H. Pariselle. Chimie & Industrie, vol. 11, no. 4, Apr. 1924, pp. 651–656. Calculation of combustion temperatures, and conclusions to be drawn therefrom; evaluation of power developed in engine by gaseous fuel.

Oil. See OIL FUEL.

Pulverized Coal. See PULVERIZED COAL.

FURNACES, ENAMELING

Electricity vs. Oil Heating. Electricity Versus Oil for Heating Iron Enameling Furnaces, H. A. Mulvaney. Jl. of Elec., vol. 52, no. 12, June 15, 1924, pp. 487–490, 6 figs. Description of application of electricity to manufacturing with resultant improvement in product, reduced spoilage and decreased cost of production.

FURNACES, HEATING

Reheating. Operation Costs of Reheating Furnaces Reduced, H. L. Read. Iron Age, vol. 113, no. 26, June 26, 1924, pp. 1864–1865, 2 figs. Installation of burners for coke-oven gas in which air proportion is maintained automatically.

FURNACES, HEAT-TREATING

Continuous, Conveyor-Type. Heat Treating at the Chevrolet Plant. Iron Age, vol. 114, no. 3, July 17, 1924, pp. 129–131, 2 figs. Describes conveyor-type continuous heat-treating furnace of new design recently made in axle and gear plant of Chevrolet Motor Co., Detroit, and its operation. Is a combination continuous hardening and drawing furnace of a double-deck type and a unique feature is that drawing furnace is located above hardening furnace and is fired by waste heat from latter.

FURNACES, METALLURGICAL

Oil-Fired Melting. Use Oil in Malleable Furnace, B. R. Mayne and C. Joseph. Foundry, vol. 52, no. 12, June 15, 1924, pp. 472–475, 5 figs. New method installed when costs become prohibitive; use same construction as was employed in coal-fired furnace; oil consumption considered low.

G

GAGES

Precision Measurement with. Fine Measurement, J. E. Sears. Machy. (Lond.), vol. 24, nos. 607, 609 and 610. May 15, 29 and June 5, 1924, pp. 209–212, 266–271 and 299–303, 22 figs. Deals with precision measurement in its relation to mechanical work; methods by which control of standard gages is effected in laboratory; recent developments in methods of precision measurement. Paper read before Instn. Mech. Engrs.

GAS PRODUCERS

Coke. Experiments with Gas Producers (Untersuchungen an Koksgeneratoren), E. Terres and J. Schierenbeck. Gas- und Wasser-fach, vol. 67, nos. 19, 20, 21, 22, and 23, May 10, 17, 24, 31 and June 7, 1924, pp. 257–263, 279–282, 296–299, 311–314 and 325–327, 11 figs. Discusses experiments carried out with gas producers to replace impirical data by exact experimental data and to study effect of constructional changes on processes under consideration. Discusses experimental arrangements, results with flat grates and inclined grates, composition of gas, etc.

GAS TURBINES

Development. History of the Progress of Gas and Oil Turbines (Die Arbeit an der Gas- und Oelturbine), W. Gentsch. Brennstoff- und Wärmewirtschaft, vol. 6, nos. 2, 3 and 4, Feb., Mar. and Apr. 1924, pp. 28–35, 48–55 and 71–79, 18 figs. Various attempts to solve problem of economical internal-combustion turbine are recorded and described, including Brown-Boveri, Schneider, Westinghouse, Stodola, General Electric, Francke, Rateau, Nash Eng. Co., etc.

GASES

Combustion, Dewpoint Temperature of. The Dewpoint Temperature of Gases from Combustion, J. N. Waite. Elec. Rev., vol. 94, nos. 2429 and 2430, June 13 and 20, 1924, pp. 954–956 and 994–996, 6 figs. Methods of calculating dewpoint temperature for gases resulting for a given fuel, fuel taken being a medium grade bituminous coal having a medium hydrogen and moisture content. Effect of change of fuel analysis on dewpoint temperature of resultant gases of combustion. Curves and tables.

Combustion of. The Combustion of Gases [Die Verbrennung von gasförmigen Brennstoffen (Generatorgas)], A. Dosch. Sprechsaal, vol. 57, nos. 14, 15 and 16, Apr. 3, 14 and 17, 1924, pp. 147–149, 157–159 and 171–173, 5 figs. Processes of combustion of various gases analyzed and explained. Quantities of air required for combustion of various gas mixtures computed and illustrated with aid of several examples.

Specific Heat. Measurement of Specific Heat C_V of Gases by Means of the Differential Method (Die Messung der spezifischen Wärme C_V von Gasen mittels der Differentialmethods), M. Trautz and K. Hebbel. Annalen der Physik, vol. 74, no. 12, 1924, pp. 285–324, 13 figs. Discusses principles of differential method and describes apparatus used.

GASOLINE

Natural-Gas. Natural-Gas Gasoline in 1922, G. B. Richardson. U. S. Geol. Surv., no. II:30, Apr. 24, 1924, pp. 347–351. United States production statistics.

GASOLINE ENGINES

Two-Cycle. Two-Cycle Gasoline Engines (Il motore a benzina a due tempi), Pasquale Borracci. Industria, vol. 38, no. 1, Jan. 15, 1924, pp. 7–11, 4 figs. Discusses their advantages in relation to their possible application in automotive work.

GEARS

Helical. High-Grade Helical Spur Wheel Gears, E. Meyer. Eng. Progress, vol. 5, no. 6, June 1924, pp. 113–117, 7 figs. Cutting teeth; materials; tooth load and velocity; angle of pitch and pitch of teeth; bearings of pinion shaft; toothed wheeled gears for vertical shafts; ratio of gearing and putput; assembly; lubrication; efficiency; silent running; life and use.

Hob Tooth Form. Hob Tooth Form, H. E. Merritt. Machy. (Lond.), vol. 24, no. 613, June 26, 1924, pp. 391–395, 4 figs. Shows that a hob can produce teeth which are mathematically exact involute teeth (neglecting effect of gashes in hob) and examines necessary axial section which hob teeth must have in order to achieve this result.

Lubrication. Gearing and Gear Lubricants, A. F. Brewer. Indus. Mgt. (N. Y.), vol. 68, no. 1, July 1924, pp. 18–24, 10 figs. Specialized needs of various types of modern gears.

GRINDING MACHINES

Electrically Driven. Electrically-driven Grinding Machines. Machy. (Lond.), vol. 24, no. 610, June 5, 1924, pp. 312–315, 8 figs. New range of self-contained grinding units by B. R. Rowland & Co., Reddish, England.

Internal Attachment. Internal Grinding Attachment. Machy. (Lond.), vol. 24, no. 610, June 5, 1924, p. 297, 2 figs. Attachment developed by Kershaw Internal Grinder Co., Manchester, more particularly for garage use in regrinding of worn automobile cylinder bores.

H

HARDNESS

Metal-Products Hardness Testing. The Logical Course of Development of Additional Apparatus for Investigating the Hardness of Metal Products in Works' Practice, H. A. Holz. Testing, vol. 1, nos. 3 and 4, Mar. and Apr. 1924, pp. 247–262, and 308–325, 29 figs. States that logical course of development of additional apparatus for investigating hardness of metals and metal products lies entirely in direction of appliances for application of Brinell test to problems for which this method has not been or could not be applied heretofore. Discusses some of the results established by Bur. Standards in its investigation of Brinell Meter, developed by F. H. Schoenfuss.

HEAT TRANSMISSION

Research. Research in Heat Transmission, E. Buckingham. Mech. Eng., vol. 46, no. 7, July 1924, pp. 386–388. Conduction, radiation, and convection; conduct of research in heat transmission; employment of dimensional analysis; variables involved in complete mathematical theory of heat transmission; suggestions in regard to planning of research programs.

HEATING AND VENTILATING

Code. Heating and Ventilating Code. Domestic Eng., vol. 105, no. 12, Dec. 22, 1923, and vol. 106, no. 2, Jan. 12, 1924, pp. 574–576 and 26–28, 2 figs. Condensed form of code of Wisconsin. See also Heat. & Vent. Mag., vol. 21, no. 2, Feb. 1924, pp. 84–87.

HEATING, HOT-AIR

Furnaces and Heating Systems. Investigation of Warm-Air Furnaces and Heating Systems—II, A. C. Willard, A. P. Kratz, V. S. Day. Univ. of Ill. Bul., Eng. Experiment Station, No. 141, May 1924, 149 pp., 91 figs. Details of investigation to determine efficiency and capacity of commercial warm-air furnaces; satisfactory and simple methods for rating furnaces; methods of increasing efficiency and capacity of furnace heating equipment; heat losses in furnace heating systems; proper sizes and proportions of leaders, stacks, and registers; etc.

HEATING, HOT-WATER

Effective Pressures in Systems. Theory of the Effective Pressures in Hot-Water Heating Systems (Theorie des wirksamen Druckes in Warmwasserheizungen), M. Wierz. Gesundheits-Ingenieur, vol. 47, no. 18, May 3, 1924, pp. 159–164, 14 figs. Forces which produce circulation are computed for various types of hot-water heating systems. Investigations

Manufactured by Advertisers — CLASSIFIED LIST OF MECHANICAL EQUIPMENT — Alphabetical List on page 148

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*Catalogue data of firms marked * appear in the A.S.M.E. Condensed Catalogues of Mechanical Equipment, 1923-24 Volume*

are limited to cases where flow has attained constant conditions.

HEATING, STEAM

Central. Low Pressure Steam for District Heating, H. A. Woodworth. Power Plant Eng., vol. 28, no. 14, July 15, 1924, pp. 763–768, 4 figs. Service to customers insures success. Estimating radiation, advantages of district heating, customer's installations, atmospheric steam heating, and operation of a heating system.

HOBBING MACHINES

Spur-Gear. An Interesting Gear Cutting Development. British Machine Tool Eng., vol. 3, no. 27, May-June 1924, pp. 61–62, 1 fig. Describes automatic, spur-gear hobbing machine.

HYDRAULIC TURBINES

15,000-B.Hp. 15,000 H.P. Water Turbine for the Tata Hydro-Electric Supply Company. English Electric Jl., vol. 2, no. 6, Apr. 1924, pp. 185–293, 8 figs. Description of unit for extension of existing Khopoli Station of Tata Hydroelectric Supply Co., in India; head 1655 ft., output 15,000 b.hp., speed 300 r.p.m. Brief reference to geographical situation of Tata power system.

Installations, Japan. Modern Hydraulic-Turbine Installations in Japan (Neuere Wasserturbinenanlagen in Japan), J. Moser. Schweizerische Bauzeitung, vol. 83, no. 19, May 10, 1924, pp. 224–226, 4 figs. Details of turbines installed by Escher Wyss & Co.

Runner Design. Hydraulic Turbine Progress, F. J. Taylor. Elec. Times, vol. 65, no. 1703, June 5, 1924, pp. 659–661, 6 figs. Trend of runner design. Increased speeds with lighter runners and lower heads.

Storek-Kaplan. Tests on Storek-Kaplan Hydraulic Turbines, H. Mikyska. Mech. Eng., vol. 46, no. 7, July 1924, pp. 420–421, 3 figs. Tests carried out on turbines of various sizes by firm of Ignaz Storek, licensees for Kaplan turbine.

HYDROELECTRIC DEVELOPMENTS

Canada. The Generation of Hydro-Electric Power in Canada, H. G. Acres. Eng. Jl., vol. 7, no. 7, July 1924, pp. 383–420, 65 figs. Progress in Canadian practice in connection with hydraulic power development. Paper read at World Power Conference.

Italy. The Italian Hydroelectric Industry, L. Dominian.- Commerce Reports—Supp., Trade Information Bul. No. 238, June 2, 1924, 17 pp. Data on extent of use of electricity in the various districts of Italy, together with specific information on many of the important hydroelectric power systems of the country.

N. E. L. A. Report. Many Developments in Hydroelectric Field. Power Plant Eng., vol. 28, no. 14, July 15, 1924, pp. 759–763, 6 figs. Report of Hydraulic Power Committee of Nat. Elec. Light Assn., giving features of equipment of new projects and problems of operation.

Pacific Coast, United States. Hydroelectric Practices and Equipment on the Pacific Coast, S. Barfoed. A.I.E.E.—Jl., vol. 43, no. 7, July 1924, pp. 641–646, 1 fig. Physical features having deciding influence on design and construction of hydroelectric plants.

Tasmania. The Great Lake Hydro-Electric Scheme, Tasmania. Engineering, vol. 117, nos. 3038, 3041, 3044, 3045, 3048 and 3051, Mar. 21, Apr. 11, May 2, 9, 30 and June 20, 1924, pp. 355–357, 451–452 and 466, 568–570, 595, 694 and 704, and 792–793, 84 figs. partly on supp. plates. Describes recently completed extension for bringing continuous capacity of scheme up to 58,000 hp.; details of most important features, including reinforced-concrete flume, Ouse River diversion works, multiple-arch dam, substations, etc.

HYDROELECTRIC PLANTS

Austria. The Mechanical and Electrical Equipment of the Partenstein Plant (Austria) (Die maschinellen und elektrischen Einrichtungen und die Stromwirtschaft des Werkes Partenstein), A. Kvetensky. Elektrotechnik u. Maschinenbau, vol. 42, no. 20, May 18, 1924, pp. 309–323, 10 figs. Description of Francis spiral turbines with vertical shafts and their control, generators, transformers, auxiliary machinery, measuring instruments, etc.; distribution system.

New Zealand. The Mangahao Power Station. Elec. Times, vol. 65, no. 1706, June 26, 1924, pp. 759–761, 5 figs. Further particulars of Mangahao power house. Capacity of plant is 24,000 kva.

HYGROMETERS

Types. Humidity and Its Measurement. Sci. & Art of Min., vol. 34, nos. 22 and 23, May 24 and June 7, 1924, pp. 342–343 and 358–359, 2 figs. Deals with chemical and physical hygrometers of different types.

Hygrometers (Die Feuchtigkeitsmessgeräte), K. Holzhausen. Feuerungstechnik, vol. 12, no. 17, June 1, 1924, pp. 141–144, 10 figs. Describes instruments with empirical calibration; by psychrometric method according to August; for air only; and for air and gases with sensible heat and impurities

I

ICE PLANTS

New York, N. Y. Mammoth Ice Plant Adopts New Methods, V. H. Vandiver and A. S. Taylor. Compressed Air Mag., vol. 29, no. 5, May 1924, pp. 851–856, 18 figs. Describes plant and equipment of Arctic Hygeia Ice Mfg. Co., New York City; 1000 tons ice per day capacity; electric drive and raw-water system replace steam drive and distilled-water system.

Raw-Water. New Ice Service Co. Plant. Refrig. Wld., vol. 59, no. 6, June 1924, pp. 11–15, 9 figs. Description of 300-ton electrically driven raw-water ice plant on West 40th Street, New York City.

Oil Engine-Driven Raw Water Ice Plant at Mattoon, Ill. Ice & Refrigeration, vol. 66, no. 6, June 1924, pp. 513–517, 8 figs. Description of 30-ton plant of Mattoon Crystal Ice Co.; intended primarily for production of ice for refrigerator car service; 50 per cent of production to be used for requirements of local ice trade.

Serv-Ice Co. Builds New Electrically Driven Raw Ice Plant in Columbus, Ind. Power Plant Eng., vol. 28, no. 14, July 15, 1924, pp. 734–738, 5 figs. Describes new 30-ton compression system ice plant built to supply local retail trade. Unusually clear product is obtained by use of lime and soda softening and high-pressure agitation.

INDICATORS

Precision Weak-Spring. A New Precision Type Weak-Spring Indicator, J. Geiger. Oil Engine Power, vol. 2, no. 5, May 1924, pp. 278–279, 9 figs. Advantages of author's new type of engine indicator are illustrated.

INDUSTRIAL MANAGEMENT

Branch Plants, Management of. How We Get Uniform Output from Widely Separated Plants, P. W. Litchfield. Factory, vol. 33, no. 1, July 1924, pp. 23–25, 116, 118 and 120–123, 2 figs. How to manage branch plants so that they function as one; how to do it and get a uniform product; how economies of one plant get themselves adopted in others located at distant points.

Budgeting. Applying the Budget System to Railroads, H. Bruere and A. Lazarus. Indus. Mgt. (N. Y.), vol. 68, no. 1, July 1924, pp. 35–46, 12 figs. Review of present practice and forecast of future possibilities.

Control of Idleness. The Control of Idleness in Industry, W. L. Conrad. Mech. Eng., vol. 46, no. 7, July 1924, pp. 402–404. Points out that one of chief causes of loss in industry is idleness of plant and personnel, due both to lack of orders or to causes within plant itself; accounting system can be made to show not only cost of idleness, but also its causes, and to indicate means of their control.

Definition of. Who Can Hire Management? H. S. Dennison. Taylor Soc.—Bul., vol. 9, no. 3, June 1924, pp. 101–110. Notes on what is "managing," who manages, and who can best choose managers.

Sales Management. An Example of Scientific Marketing Procedure, S. Cowan. Taylor Soc.—Bul., vol. 9, no. 3, June 1924, pp. 143–151, 3 figs. Method of analyzing buying groups and circulation; comparing occupational and income groups; analysis of magazine circulation; circulation by occupational groups. Practical applications.

Sales-Production Schedules. Coördination of Sales and Production, Jos. H. Barber. Taylor Soc.—Bul., vol. 9, no. 3, June 1924, pp. 111–131, 10 figs. How Walworth Mfg. Co. establishes precise sales-production schedules.

Shipping Methods. From "Order Received" to Freight-Car Door, J. M. Schappert. Factory, vol. 33, no. 1, July 1924, pp. 45–47 and 141–142, 13 figs. Complete shipping system of Metal Stamping Co.

Stores Accounting. Balance-of-Stores Acocunting System, I. D. Murfield. Elec. Wld., vol. 84, no. 2, July 12, 1924, pp. 66–69, 5 figs. Description of a stores accounting system which has resulted in a reduction of amount of money tied up, also a reduction of stock carried. Maximum and minimum stocks to be carried are specified by utility department heads.

Stores Management. The Care and Control of Raw Materials. Factory, vol. 33, no. 1, July 1924, pp. 34–35 and 135–136, 1 fig. Practice at plant of Bausch & Lomb Optical Co.

Time Study. See TIME STUDY.

INDUSTRIAL ORGANIZATION

Factory, Medium-Size. The Problems of Industrial Organization and Their Solution (Brennende Probleme der Betriebsorganisation und der Weg zu ihrer natürlichen Lösung), Geo. Schlesinger. Schweizerische Bauzeitung, vol. 83, no. 21, May 24, 1924, pp. 243–247, 3 figs. Describes plan, design and equipment of medium-size factory, employing 150 workmen, constructed and organized by author, as example of economy of scientific organization.

INDUSTRIAL PLANTS

Railways. Industrial Transportation Over Definite Lines of Travel, M. W. Potts. Indus. Mgt. (N. Y.), vol. 68, no. 1, July 1924, pp. 50–57, 10 figs. Summary of advantages and limitations of industrial railway as a means for efficient handling of materials.

INSULATION, HEAT

Air Spaces. The Heat-Insulating Capacity of Air Spaces (Die Isolierfähigkeit von Luftschichten nach neue en Forschungen), H. Hamester. Wärme- und Kälte-Technik, vol. 26, no. 8, Apr. 30, 1924, pp. 64–66. Modern investigations covering conduction connection and radiation of heat through air spaces are reported.

INTEGRATION

Graphic Methods. Graphic Integration Methods (Graphische Integrationsmethoden), C. Runge. Zeit. für Technische Physik, vol. 5, no. 5, 1924, pp. 161–165, 6 figs. Discusses linear and quadratic interpolation, calculation of values of whole functions, graphic integration and differential of curves, graphic integration of linear differential equations of first order.

INTERNAL-COMBUSTION ENGINES

Chemical Structure. Chemical Structure of Motor Engine, E. Sokal. Oil & Gas Jl., vol. 23, no. 5, June 26, 1924, pp. 88, 126–127 and 130–131. Catalytic coating for surface of cylinder head suggested for counteracting carbon and detonation. Accelerates combustion.

Cooling Water, Utilization of Heat in. Utilization of the Heat in the Cooling Water of Internal Combustion Engines (Die Ausnutzung der im Kühlwasser der Verbrennungsmotoren enthaltenen Wärme), Wärme- und Kälte- Technik, vol. 26, no. 8, Apr. 30, 1924, pp. 63–64, 3 figs. Various combinations of radiators with water jackets of internal-combustion engines are shown.

Heat Transmission from Working Fluid. The Rate of Heat Transmission from the Working Fluid in an Internal Combustion Engine, A. H. Gibson. Lond., Edinburgh, & Dublin Philosophical Mag. & Jl., Sci. vol. 47, no. 281, May 1924, pp. 883–895. Results from investigations and conclusions.

Inert Diluents. Inert Diluents, J. F. Alcock. Automobile Engr., vol. 14, no. 190, June 1924, pp. 165–170, 10 figs. Their effect on working fluid of internal-combustion engine.

[See also AIRPLANE ENGINES; AUTOMOBILE ENGINES; DIESEL ENGINES; GASOLINE ENGINES; OIL ENGINES]

IRON AND STEEL

Canadian Industry. The Iron and Steel Industry in Canada, C. S. Cameron. Iron & Coal Trades Rev., vol. 108, no. 2936, June 6, 1924, pp. 971–974. Data regarding different steel works. Confines attention to fundamental processes, smelting of ore and production of primary forms of steel and those made directly from them, such as merchant bars, structural shapes, rails, plates, wire rods, and generally those that are sent from works of origin to others for further fabrication. From paper read at Empire Mining and Metallurgical Congress.

Chemical Specifications. Are Chemical Specifications for Iron and Steel Too Rigid? Iron & Steel Engr., vol. 7, no. 7, July 1924, pp. 130 and 133. Investigation by British Chemical Standards movement. From paper read by C. H. Ridsdale at joint mtg. of Cleveland Instn. Engrs., Soc. Chem. Industry and Inst.

Fatigue. Fatigue Phenomena and Endurance Tests (Ermüdungserscheinungen und Dauerversuche), R. Mailänder. Berichte der Fachausschüsse des Vereins deutscher Eisenhüttenleute, Werkstoffausschuss, report no. 38, Mar. 15, 1924, 27 pp. Determination of working strength; shortened endurance tests; machines and devices for endurance tests; fracture and its appearance; different kinds of stress; influence of heat treatment, composition and structure. Bibliography.

Indian Industry. India's Iron and Steel Industry, H. M. S. Tuckwell. Iron & Coal Trades Rev., vol. 108, no. 2939, June 27, 1924, pp. 1123–1125. Data regarding Tata Iron & Steel Co., Bengal Iron Co., Indian Iron & Steel Co., United Steel Corporation of Asia, and Mysore Ironworks; present position and future prospects. Paper read before Iron & Steel Sec., Empire Min. & Met. Congress.

L

LABOR

Bibliographies. Publications Relating to Labor. Monthly Labor Rev., U. S. Bur. Labor Statistics, vol. 18, no. 6, June 1924, pp. 205–212.

Hours of Work. Hours of Work and Output, O. Lipmann. Int. Labour Rev., vol. 9, no. 4, Apr. 1924, pp. 481–506. Economic aspect of 8-hour day; author surveys existing data on relation between hours of work and output and finds few of them scientifically satisfactory; analyzing various factors determining hourly output, he shows extreme complexity of problem and danger of attributing changes in output solely to changes in hours; he believes that solution of problem of increasing output is to be found rather in increased intensity of work than in change in working hours. Bibliography.

Legislation, Mexico. Labor Law of Jalisco, Mexico, E. Y. Larson. Monthly Labor Rev., U. S. Bur. Labor Statistics, vol. 18, no. 6, June 1924, pp. 21–36. Law covers labor contracts, rights and obligations of contracting parties, hours and wages, conciliation and arbitration, employers' organizations and trade unions, strikes and lockouts, private employees, shop rules, apprentices, safety and hygiene regulations, workmen's compensation and labor inspection.

Wages and Hours. Wages and Hours of Labor in the Automobile Tire Industry, 1923. U. S. Bur. Labor Statistics—Bul., no. 358, Apr. 1924, pp. 1–58. Report shows results of study of wages and hours of labor in automobile tire industry in 1923. Information compiled covers 22,535 male wage earners and 1624 female wage earners working in 49 representative establishments located in Connecticut. Indiana, Massachusetts, Michigan, New Jersey, New York, Ohio, Pennsylvania and Wisconsin. Tables show earning as per hour, full time or customary hours per week, hours and days actually worked, and earnings actually received in representative pay period taken.

LABOR TURNOVER

Reduction of. What 86 Years Have Taught Us About Selecting Labor, H. B. Cheney. Monthly Labor Rev., vol. 18, no. 5, May 1924, pp. 1–13, 5 figs. Factors affecting labor cost; how to fit applicant to right job; keeping labor turnover down to minimum; how "credit rating" plan aids in reducing turnover.

LATHES

Developments. Notes on Lathe Developments, F. Horner. English Mechanics, vol. 119, nos. 3088, 3084 and 3085, Apr. 25, May 2 and 9, 1924, pp. 196–197, 215–216 and 231, 4 figs. Brief résumé of progress in lathe construction.

Manufactured by Advertisers — CLASSIFIED LIST OF MECHANICAL EQUIPMENT — Alphabetical List on page 148

Instrument, Recording
* American Schaeffer & Budenberg Corp'n
* Ashton Valve Co.
Bacharach Industrial Instrument Co.
* Bailey Meter Co.
* Bristol Co.
* Builders Iron Foundry
* Crosby Steam Gage & Valve Co.
* General Electric Co.
* Tagliabue, C. J. Mfg. Co.
* Taylor Instrument Cos.
* Westinghouse Electric & Mfg. Co.

Instruments, Scientific
* Taylor Instrument Cos.
Weber, F. Co. (Inc.)

Instruments, Surveying
Dietzgen, Eugene Co.
Keuffel & Esser Co.
New York Blue Print Paper Co.
ParVell Laboratories
U. S. Blue Co.
Weber, F. Co. (Inc.)

Insulating Materials (Electrical)
* General Electric Co.
Johns-Manville (Ince.

Insulating Materials (Heat and Cold)
* Celite Products Co.
Johns-Manville (Inc.)
* King Refractories Co. (Inc.)
* Quigley Furnace Specialties Co.

Insulation, Boiler
Carey, Philip Co.
* Celite Products Co.

Insulation, Heat
Carey, Philip Co.

Joints, Expansion
Carey, Philip Co.
* Crane Co.
* Croll-Reynolds Engineering Co.
Hamilton Copper & Brass Works
Lunkenheimer Co.
* Pittsburgh Valve, Fdry. & Const. Co.
* United States Rubber Co.
* Wheeler, C. H. Mfg. Co.

Joints, Flanged Pipe
* Crane Co.
* Pittsburgh Valve, Fdry. & Const. Co.

Joints, Flexible
* Barco Mfg. Co.

Joints, Swing and Swivel
* Barco Mfg. Co.
Lunkenheimer Co.

Kettles, Steam Jacketed
* Cole, R. D. Mfg. Co.
* Nordberg Mfg. Co.
* Titusville Iron Works Co.

Keys, Machine
* Smith & Serrell
* Whitney Mfg. Co.

Keyseating Machines
* Whitney Mfg. Co.

Kilns, Dry (Brick, Lumber, Stone, etc.)
* American Blower Co.
* Sturtevant, B. F. Co.

Ladles
* Whiting Corp'n

Lamps, Incandescent
* General Electric Co.
Johns-Manville (Inc.)
* Westinghouse Electric & Mfg. Co.

Land-Clearing Machinery
Clyde Iron Works Sales Co.

Lathes, Automatic
* Jones & Lamson Machine Co.

Lathes, Brass
* Warner & Swasey Co.

Lathes, Chucking
* Jones & Lamson Machine Co.

Lathes, Engine
* Builders Iron Foundry

Lathes, Turret
* Jones & Lamson Machine Co.
* Warner & Swasey Co.

Levers, Flexible (Wire)
* Gwilliam Co.

Lifts, Lumber
Leitelt Iron Works

Lighting Equipment
* Westinghouse Elect. & Mfg. Co.

Linings, Brake
Johns-Manville (Inc.)

Linings, Furnace
* Celite Products Co.
Johns-Manville (Inc.)
* King Refractories Co. (Inc.)
* McLeod & Henry Co.
* Quigley Furnace Specialties Co.

Linings, Stack
Johns-Manville (Inc.)

Loaders, Portable
* Gifford-Wood Co.
Link-Belt Co.

Locomotives, Electric
* General Electric Co.
* Westinghouse Electric & Mfg. Co.

Locomotives, Storage Battery
* General Electric Co.
* Westinghouse Electric & Mfg. Co.

Logging Machinery
Clyde Iron Works Sales Co.
Lidgerwood Mfg. Co.

Lubricants
* Dixon, Joseph Crucible Co.
* Royersford Fdry. & Mach. Co.
Vacuum Oil Co.

Lubricating Systems
* Bowser, S. F. & Co. (Inc.)
Lunkenheimer Co.

Lubricators, Cylinder
* Bowser, S. F. & Co. (Inc.)
Lunkenheimer Co.

Lubricators, Force-Feed
* Bowser, S. F. & Co. (Inc.)
Lunkenheimer Co.

Lubricators, Hydrostatic
* Crosby Steam Gage & Valve Co.
Lunkenheimer Co.

Lubricators (Sight Feed)
* Crosby Steam Gage & Valve Co.
Lunkenheimer Co.

Machine Tool Feed Control Systems (Oil Pressure)
* American Fluid Motors Co.

Machine Work
* Brown, A. & F. Co.
* Builders Iron Foundry
Farrel Foundry & Machine Co.
* Franklin Machine Co.
Hill Clutch Machine & Fdry. Co.
Johnson, Carlyle Machine Co.
* Jones, W. A. Fdry. & Mach. Co.
Lammert & Mann Co.
Link-Belt Co.
* Nordberg Mfg. Co.

Machinery
(Is classified under the headings descriptive of character thereof)

Manometers
* American Blower Co.
Bacharach Industrial Instrument Co.
* Simplex Valve & Meter Co.

Mechanical Draft Apparatus
* American Blower Co.
* Clarage Fan Co.
* Coppus Engineering Corp'n
* Green Fuel Economizer Co.
* Sturtevant, B. F. Co.

Mechanical Stokers
(See Stokers)

Metal Treating
* American Metal Treatment Co.

Metals, Perforated
* Hendrick Mfg. Co.

Meters, Air and Gas
Bacharach Industrial Instrument Co.
* Bailey Meter Co.
* Builders Iron Foundry
* General Electric Co.

Meters, Boiler Performance
* Bailey Meter Co.

Meters, Condensation
* Simplex Valve & Meter Co.

Meters, Electric
* General Electric Co.
* Westinghouse Electric & Mfg. Co.

Meters, Feed Water
* Bailey Meter Co.
* Builders Iron Foundry
* Cochrane Corp'n
* General Electric Co.
Hoppes Mfg. Co.
* Simplex Valve & Meter Co.
* Worthington Pump & Machinery Corp'n

Meters, Flow
Bacharach Industrial Instrument Co.
* Bailey Meter Co.
* Cochrane Corp'n
* General Electric Co.
* Simplex Valve & Meter Co.

Meters, Oil
* Bowser, S. F. & Co. (Inc.)
* Cochrane Corp'n
* General Electric Co.
* Simplex Valve & Meter Co.
* Worthington Pump & Machinery Corp'n

Meters, Pitot Tube
* American Blower Co.
* Simplex Valve & Meter Co.

Meters, Steam
* Bailey Meter Co.
* Builders Iron Foundry
* Cochrane Corp'n
* General Electric Co.

Meters, V-Notch
* Bailey Meter Co.
* Cochrane Corp'n
* General Electric Co.

Meters, Venturi
* Builders Iron Foundry
* National Meter Co.
* Simplex Valve & Meter Co.

Meters, Water
* Cochrane Corp'n
* General Electric Co.
Hoppes Mfg. Co.
* National Meter Co.
* Simplex Valve & Meter Co.
* Worthington Pump & Machinery Corp'n

Milling and Drilling Machines (Combined)
Universal Boring Machine Co.

Milling Machines, Hand
* Whitney Mfg. Co.

Milling Machines, Keyseat
* Whitney Mfg. Co.

Milling Machines, Plain
* Warner & Swasey Co.

Mills, Ball
* Allis-Chalmers Mfg. Co.
* Smidth, F. L. & Co.
* Worthington Pump & Machinery Corp'n

Mills, Blooming and Slabbing
Mackintosh-Hemphill Co.

Mills, Grinding
Farrel Foundry & Machine Co.
* Smidth, F. L. & Co.

Mills, Sheet and Plate
Mackintosh-Hemphill Co.

Mills, Structural, Rail and Bar
Mackintosh-Hemphill Co.

Mills, Tube
* Allis-Chalmers Mfg. Co.
* Smidth, F. L. & Co.
* Worthington Pump & Machinery Corp'n

Mining Machinery
* Allis-Chalmers Mfg. Co.
* General Electric Co.
* Ingersoll-Rand Co.
* Worthington Pump & Machinery Corp'n

Monel Metal
Driver-Harris Co.

Monorail Systems
(See Tramrail Systems, Overhead)

Motor-Generators
* Allis-Chalmers Mfg. Co.
* General Electric Co.
Ridgway Dynamo & Engine Co.
* Westinghouse Electric & Mfg. Co.

Motors, Electric
* Engberg's Electric & Mech. Wks.
* General Electric Co.
Master Electric Co.
Ridgway Dynamo & Engine Co.
* Sturtevant, B. F. Co.
* Westinghouse Electric & Mfg. Co.

Motors, Synchronous
Ridgway Dynamo & Engine Co.

Nickel, Sheet
Driver-Harris Co.

Nipple Threading Machines
* Landis Machine Co. (Inc.)

Nitrogen Gas
* Linde Air Products Co.

Nozzles, Blast
* Schutte & Koerting Co.

Nozzles, Sand and Air
Lunkenheimer Co.

Nozzles, Spray
* Cooling Tower Co. (Inc.)
* Schutte & Koerting Co.

Odometers
Veeder Mfg. Co.

Ohmeters
* General Electric Co.

Oil and Grease Cups
* Bowser, S. F. & Co. (Inc.)
* Crane Co.
Lunkenheimer Co.

Oil and Grease Guns
* Royersford Fdry. & Mach. Co.

Oil Burning Equipment
Bethlehem Shipbldg.Corp'n(Ltd.)
* Combustion Engineering Corp'n
* Schutte & Koerting Co.

Oil Filtering and Circulating Systems
* Bowser, S. F. & Co. (Inc.)

Oil Mill Machinery
* Worthington Pump & Machinery Corp'n

Oil Refinery Equipment
Bethlehem Shipbldg.Corp'n(Ltd.)
* Vogt, Henry Machine Co.

Oil Storage and Distributing Systems
* Bowser, S. F. & Co. (Inc.)

Oil Well Machinery
* Ingersoll-Rand Co.
* Titusville Iron Works Co.
* Worthington Pump & Machinery Corp'n

Oiling Devices
* Bowser, S. F. & Co. (Inc.)
Lunkenheimer Co.

Oiling Systems
* Bowser, S. F. & Co. (Inc.)
Lunkenheimer Co.

Oils, Lubricating
Vacuum Oil Co.

Ore Handling Machinery
* Brown Hoisting Machinery Co.
Chain Belt Co.
Link-Belt Co.

Ovens, Core
* Whiting Corporation

Oxy-Acetylene Supplies
* Linde Air Products Co.

Oxygen Gas
* Linde Air Products Co.

Packing, Ammonia
Garlock Packing Co.
France Packing Co.
* Goodrich, B. F. Rubber Co.
* United States Rubber Co.

Packing, Asbestos
Garlock Packing Co.
* Goodrich, B. F. Rubber Co.
Johns-Manville (Inc.)

Packing, Centrifugal Pump
Garlock Packing Co.

Packing, Hydraulic
France Packing Co.
Garlock Packing Co.
* Goodrich, B. F. Rubber Co.
Johns-Manville (Inc.)

Packing, Metallic
France Packing Co.
Garlock Packing Co.
Johns-Manville (Inc.)

Packing, Rod (Piston and Valve)
France Packing Co.
Garlock Packing Co.
* Goodrich, B. F. Rubber Co.
* Jenkins Bros.
Johns-Manville (Inc.)
* United States Rubber Co.

Packing, Rubber
Garlock Packing Co.
* Goodrich, B. F. Rubber Co.
* Jenkins Bros.
Johns-Manville (Inc.)
* United States Rubber Co.

Packing, Sheet
Garlock Packing Co.
* Goodrich, B. F. Rubber Co.
* Jenkins Bros.
Johns-Manville (Inc.)
* United States Rubber Co.

Paints, Concrete (For Industrial Purposes)
Smooth-On Mfg. Co.

Paint, Metal
* Dixon, Joseph Crucible Co.
* General Electric Co.
Johns-Manville (Inc.)

Panel Boards
* Westinghouse Elect. & Mfg. Co.

Paper, Drawing
Dietzgen, Eugene Co.
Keuffel & Esser Co.
New York Blue Print Paper Co.
ParVell Laboratories
U. S. Blue Co.
Weber, F. Co. (Inc.)

Paper, Sensitized
Dietzgen, Eugene Co.
Keuffel & Esser Co.
New York Blue Print Paper Co.
ParVell Laboratories
U. S. Blue Co.
Weber, F. Co. (Inc.)

Paper Mill Machinery
Farrel Foundry & Machine Co.

Paraffine Wax Plant Equipment
Bethlehem Shipbldg.Corp'n(Ltd.)
* Vogt, Henry Machine Co.

*Catalogue data of firms marked * appear in the A.S.M.E. Condensed Catalogues of Mechanical Equipment, 1923-24 Volume*

Inspection in Building. The Inspection System in a Lathe Building Plant, H. S. Riggs. Machy. (N. Y.), vol. 30, no. 11, July 1924, pp. 835–841, 12 figs. Checking accuracy of lathe parts, assembled units and completed machines.

Interchangeable Manufacture. Building Lathes Interchangeably. Machy. (Lond.), vol. 24, no. 613, June 26, 1924, pp. 389–392, 8 figs. Manufacturing methods used to facilitate assembly of machines and supply of replacement parts.

Magazine Attachments. Design of Magazine Attachments, A. A. Dowd. Machy. (N. Y.), vol. 30, no. 11, July 1924, pp. 847–850, 8 figs. Magazine attachments for irregular work.

Semi-Automatic. Semi-Automatic Lathe of Interesting Design, C. C. Walker. Machy. (N. Y.), vol. 30, no. 11, July 1924, pp. 870–873, 6 figs. Construction of machine; character of work; special form cutter used.

Turret. The Ungeared Capstan Lathe as a Chucking Machine, E. W. Field. British Machine Tool Eng., vol. 3, no. 27, May-June 1924, pp. 54–60, 10 figs. Includes layout for cone-driven friction-geared lathe of 6½ in. centers built by H. W. Ward & Co., and examples on ungeared range by same maker. Describes various processes.

LIGHTING

Research. Coördination of Research in Illuminating Engineering and Some Practical Applications, J. S. Dow. Illuminating Engr., vol. 17, no. 1–3, Jan.-Mar. 1924, pp. 6–15 and (discussion) 16–18. Classification of research; research on photometry and standards of light; illuminants and lighting appliances; research on glare; collection of statistical data on illumination; facilities for research.

Workshops. Rules and Regulations for the Illumination of Factories and Other Industrial Workshops (Leitsätze für die Beleuchtung von Fabriken und anderen gewerblichen Arbeitsstätten), H. Lux. Licht u. Lampe, no. 10, May 8, 1924, pp. 255–257. Established by a number of interested German societies and authorities.

LIQUIDS

Distilling, Evaporating and Condensing. Distilling, Concentrating, Evaporating and Condensing Liquids. Abridgments of Specifications, class 32, period 1916–20, 1924, 152 pp. Patents for inventions.

Thermal Conductivity. Convective Cooling in Liquids—Some Thermal Conductivity Data, A. H. Davis. Lond., Edinburgh, & Dublin Philosophical Mag. & Jl. Sci., vol. 47, no. 281, May 1924, pp. 972–975. Direct determinations of thermal conductivity at various temperature, to supplement information previously given.

LOCOMOTIVES

Behavior of Wheels on Track. Behaviour and Movement of Locomotive Wheels on the Track, J. Buchli. Int. Ry. Congress Assn.—Bul., vol. 6, no. 6, June 1924, pp. 417–437, 30 figs. Trials carried out on model which reproduced conditions encountered in practice as accurately as possible with object of ascertaining lateral adhesion of wheel on rail under most widely different service conditions. Translated from Schweizerische Bauzeitung.

Diesel-Electric. The American Diesel-Electric Locomotive is Here. Oil Engine Power, vol. 2, no. 5, May 1924, pp. 257–259, 5 figs. 300-b.hp. locomotive constructed by Gen. Elec. and Ingersoll-Rand Companies, with 6-cylinder airless-injection 4-cycle type Ingersoll-Rand oil engine directly connected to 200-kw. Gen. Elec. generator.

Electric. See ELECTRIC LOCOMOTIVES.

Erection. An Improved Method of Locomotive Erection by the Use of Erecting Forms, S. R. Limerick. Baldwin Locomotives, vol. 3, no. 1, July 1924, pp. 28–32, 8 figs. Describes mechanical erector, developed by Baldwin Locomotive Wks., a device for absolute control of work of erecting a locomotive, eliminating all possibility of errors in alignment, inequalities of measurement and all variances formerly existent in locomotives incidental to exercise of personal judgment or skill on part of workman. Erection of locomotive by this method.

Four-Cylinder. New Four-Cylinder "Baltic" Tank Engines, London Midland & Scottish Railway. Ry. Engr., vol. 45, no. 533, June 1924, pp. 207–209, 5 figs. Details of 4–6–4-type locomotive, ten of which are being introduced for working suburban passenger and shorter-distance residential main-lane traffic.

4-6-0 Type. A New Pennsylvania R. R. Locomotive. Ry. Gaz., vol. 40, no. 25, June 20, 1924, pp. 891–892, 2 figs. Particulars of first of a new class of locomotives designed for passenger train service and built at company's shops at Altoona, Pa.; 4–6–0 type, with outside cylinders driving middle pair of coupled wheels, steam being distributed to cylinders by piston valves actuated by Walschaerts valve gear; light reciprocating parts; high tractive effort.

Garratt. The First "Garratt" Locomotive in Great Britain. Ry. Gaz., vol. 40, no. 24, June 13, 1924, pp. 844–847, 7 figs. Working of Garratt locomotive employed at Hafod copper mills of Vivian & Sons, Swansea.

Meter-Gage. New 4–6–0 Type Metre Gauge Locomotives, Bombay, Baroda & Central India Railway. Ry. Gaz., vol. 40, no. 24, June 13, 1924, pp. 848–850, 6 figs. Features of interest of engines which are largest in use on Indian meter-gage lines.

Mikado. New Mikado-Type Locomotive for Heavy High-Speed Traffic (Nuove locomotive Mikado (1–4–1) a grande velocità per treni diretti pesanti su linee accidentate delle Ferrovie dello Stato Italiano), Enrico Levi. Rivista tecnica delle Ferrovie Italiane, vol. 25, no. 4, April 15, 1924, pp. 109–117, 7 figs. Illustrated description of new 4-cylinder compound 2–8–2 engine designed by engineers of Italian State Railways.

Rods, Boring and Testing of. Fixtures for Boring and Testing Locomotive Rods, F. H. Colvin. Am. Mach., vol. 60, no. 26, June 26, 1924, pp. 947–949, 8 figs. Some of the methods and tools used by Lima Locomotive Works in boring and testing side rods of plain and articulated types.

Steam-Turbine. A New Geared Turbine Condensing Locomotive. Ry. Engr., vol. 45, no. 533, June 1924, pp. 200–201, 2 figs. Constructed on Reid-Macleod system and patented by North Brit. Locomotive Co.

Thermal Efficiency. Engineering and Business Considerations of the Steam Locomotive, W. H. Winterrowd. Ry. Age, vol. 76, no. 30, June 13, 1924, pp. 1468–1471 and (discussion) 1471–1473, 3 figs.; also Ry. Rev., vol. 74, no. 24, June 14, 1924, pp. 1103–1108, 4 figs. Author disputes impression that steam locomotive is inefficient and losing its vitality; comparison of thermal efficiency curves of locomotive and stationary boiler proves conclusively that locomotive boiler is more efficient generator of steam; and by further development of superheated steam, larger grate area and higher boiler pressure, still greater maximum thermal efficiency can be obtained. Paper read before Am. Ry. Assn.

Three-Cylinder. Lehigh Valley Three-Cylinder Locomotive. Ry. Age (Daily Edition), vol. 76, no. 32, June 14, 1924, pp. 1585–1587, 6 figs. Details of 4–8–2 type, weighing 369,000 lb.; boiler is of inverted wagon-top type. See also article, entitled, Performance of 3-Cylinder Locomotive No. 5000, in Ry. Rev., vol. 74, no. 24, June 14, 1924, pp. 1079–1093, 13 figs. Gives details of construction and record of results.

The Three-Cylinder Locomotive, J. G. Blunt. Ry. Age, vol. 76, no. 30, June 13, 1924, pp. 1473–1476 and (discussion) 1476–1479, 7 figs. Normal tractive force; economy of 3-cylinder locomotive; crank-axle driving box; middle main rod, valve gear and crosshead.

Tires, Shrink Fits. Material Stresses in Shrunk-on Wheel Tires (Beräkning av materialpakänningar vid pakrympning av hjulringar), J. S. Fries. Teknisk Tidskrift, vol. 54, no. 5, May 17, 1924, pp. 54–55 (Mekanik) 4 figs. Theoretical investigations moderate that allowance for shrink fit should not exceed 0.001 in. diameter in case of soft steel and 0.00075 in. in case of hard steel tires.

LUBRICATING OILS

Purifier for. The Centrifugal Oil Purifier. Power Engr., vol. 19, no. 219, June 1924, pp. 207–208, 2 figs. Methods and functions of centrifugal oil filters and cleaners, with particular reference to the De Laval machine.

LUBRICATION

Journal. Journal Lubricating System. Ry. Age, vol. 76, no. 37, June 21, 1924, p. 1783, 2 figs. Phee system of journal lubrication developed by Froedtert Equipment Corp., Milwaukee, Wis.

Machinery. The Development of Automatic Lubrication. Lubrication, vol. 10, no. 4, Apr. 1924, pp. 37–48, 27 figs. A study of the various devices that have been involved.

Prime Movers. Prime Movers and Their Lubrication. Power Plant Eng., vol. 28, no. 14, July 15, 1924, pp. 739–742, 4 figs. What oil must lubricate, method of applying lubricant, operating conditions that must be met, and determination of correct lubrication; continuous lubrication; steam-turbine lubrication.

M

MACHINE SHOPS

Equipment. American Machinist Shop Equipment Review. Am. Mach., vol. 61, no. 3, July 17, 1924, pp. 89–131, 238 figs. Semi-annual résumé of machines, tools, and accessories described in Shop Equipment News section of Am. Mach. during first six months of 1924.

Progress. Six Months in the Machine Shop Field. Am. Mach., vol. 61, no. 3, July 17, 1924, pp. 81–87. A review, in seven articles, of progress made during first half of 1924 in machinery field, railroad field, automotive industry, electric power and manufacturing industries, distribution of materials and supplies, and in exporting.

MACHINE TOOLS

British Design. British Machine-Tool Design, W. E. Sykes. Mech. Eng., vol. 46, no. 7, July 1924, pp. 395–401, 21 figs. Present status as shown by examples representative of current practice.

Development, New England. Development of Machine Tools in New England, G. Hubbard. Am. Mach., vol. 60, nos. 4, 5, 6, 7, 8, 12, 17, 24 and 26, Jan. 24, 31, Feb. 7, 14, 21, Mar. 20, Apr. 24, June 12 and 26, 1924, pp. 129–132, 171–173, 205–209, 255–258, 271–274, 437–441, 617–620, 875–878 and 951–954, 70 figs. Jan. 24: American exhibit at Crystal Palace; famous Enfield (England) Armory equipped with machinery and tools from New England; gages sent from England made of wood. Jan. 31: Hartford plant of Robbins & Lawrence turns out world-famous products and finally becomes part of Pratt & Whitney plant. Feb. 7: Windsor machine tools still in use; development of drilling machine. Feb. 14: Examples of early milling machines; first universal milling machine; edging or profiling machine. Feb. 21: Lathes and swiveling headstocks; tailstocks with square spindles; an early bolt-threading machine; evolution of turret lathe. Mar. 20: Officers of Robbins & Lawrence Co.; New England mechanics who have become famous. June 12: Drawings of machine tools in colors; interchangeable work at Harper's Ferry. June 26: Circumstances that led to formation of Jones & Lamson Machine Co.

Railway Exhibit, Atlantic City. Digest of New Machine Tools and Shop Equipment. Iron Trade Rev., vol. 75, no. 1, July 3, 1924, pp. 39–45, 23 figs. Descriptions of machine tools and other equipment exhibited at joint convention of Am. Ry. Assn. and Ry. Supply Mfrs.' Assn. at Atlantic City. Exhibition was intended primarily for railway shop tools and appliances, but nearly all of the machines and much of the equipment were applicable to all branches of metal-working industry.

Speed Charts. Alignment Charts for Speeds (Fluchtlinientafel für Drehzahlen), H. Behr. Werkstattstechnik, vol. 18, no. 11, June 1, 1924, pp. 294–296, 3 figs. Plotting of alignment chart for determination of geometrical-series speeds, magnitude of average cutting-speed reduction and of quotients of geometrical series.

MANGANESE STEEL

Welding of. Welding of Manganese Steel. Am. Welding Soc.—Jl., vol. 3, no. 5, May 1924, pp. 10–23, 14 figs. Discusses briefly what manganese steel is, its properties, and why it has those properties. Investigations of what happens during welding of manganese steel, how actual operation may be best conducted, and what structural results of welding are in both base metal and weld. Preliminary report of Gas Welding Committee of Am. Bur. Welding.

MARINE BOILERS

Tests. Tests of Marine Boilers, H. Kreisinger, J. Blizard, A. R. Mumford, B. J. Cross, W. R. Argyle and R. A. Sherman. U. S. Bur. Mines, Bul. 214, 1924, 302 pp., 181 figs. partly on supp. plates. Describes evaporative tests of marine water-tube boilers, and of Scotch marine boiler, including description of method of conducting tests, and of such special studies as were made of: combustion in furnaces; heat absorption by boilers; flow of gases through boilers by means of temperature, pitot-tube, and draft measurements; insulation of furnace walls; circulation of water in boiler; effect on heat transmission of blowing soot off heating surfaces with steam blowers; and use of special equipment to improve combustion or to improve heat absorption.

MATERIALS

Rupture. Conditions Causing Rupture of Material (Betingelserna für materialbrott), A. F. Samsioe. Teknisk Tidskrift, vol. 54, no. 24, June 14, 1924, pp. 221–223 (Allmanna Avdelningen), 7 figs. Older theories are recorded. Guest's experiments with tough metals are described. Shearing stress or greatest difference between stresses occurring in different directions are proved to cause ruptures of material. Mohr's theory for brittle materials is explained.

MATERIALS HANDLING

Economies of. Fundamental Economies of Materials Handling, M. L. Begeman. Mech. Eng., vol. 46, no. 7, July 1924, pp. 405–409 and (discussion) 410. Discusses advantages of handling materials mechanically without reference to particular types of equipment; deals with necessity for substitution of mechanical handling of materials for labor and economies to be gained by such substitution; points to be considered in analysis of proposed installation.

Factories. Development of Conveying and Unloading Plants into Large Scale Installations (Die Entwicklung der Förder- und Verladeanlagen zu grossen Abmessungen and Leistungen), G. v Hanffstengel. Maschinenbau, vol. 3, no. 16, May 22, 1924, pp. 557–567, 34 figs. Discusses extensions of conveying and unloading plants generally; advantages of large capacities; progress in various conveying systems; conveying by air or water.

Machine Shops. Train-Despatching in an Automotive-Parts Shop, R. S. Spencer. Am. Mach., vol. 60, no. 26, June 26, 1924, pp. 945–946, 3 figs. How a force of 250 truckers has been reduced to 9 men by application of railroad train-despatching methods to interdepartmental transportation of materials.

MEASURING INSTRUMENTS

Thread Recorder. Some Uses of the Thread Recorder in the Measurement of Physical Properties, J. L. Haughton and W. T. Griffiths. Jl. of Sci. Instruments, vol. 1, no. 8, May 1924, pp. 225–233, 9 figs. Methods of employing thread recorder for recording changes of dilation and resistivity of metals and alloys with temperature. Describes also method of combining recorded time-temperature and time-property curves to give a single temperature-property curve.

Torsion Meter. The Moullin Torsion Meter. Engineering, vol. 117, no. 3050, June 13, 1924, pp. 764–765, 12 figs. Apparatus for measuring torque in shafts up to 10 in. diam. and transmitting 1500 hp.

MERCURY-VAPOR PROCESS

Principles and Applications. Mercury Vapor as an Industrial Heating Medium, C. Field. Chem. & Met. Eng., vol. 30, no. 25, June 23, 1924, pp. 987–991, 8 figs. Outline of system, with discussion of various other sources of heat at high temperature available for industrial use.

METALS

Cold Working. Effect of Severe Cold Working on Scratch and Brinell Hardness, H. S. Rawdon and W. H. Mutchler. Am. Inst. Min. & Met. Engrs.—Trans., No. 1340-N, May 1924, pp. 3–14, 4 figs. Discussion of above paper, presented at New York Mtg., Feb. 1924, and issued as Paper No. 1291–M, with Min. & Metallurgy, Jan. 1924.

Interpretation of Cold Working on the Basis of Electric Measurements (Zur Deutung der Kaltbearbeitung auf Grund elektrischer Messungen), W. Geiss and J. A. M. vanLiempt. Zeit. für Anorganische und Allgemeine Chemie, vol. 133, no. 1, Feb. 11, 1924, pp. 107–112. Discusses deformation of metal crystals in cold working and current hypotheses; application of X-ray analysis and its limitations.

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Corrosive Agents, Behavior under Action of. How Metals Stand Up Against Corrosion. Chem. & Met. Eng., vol. 31, no. 2, July 14, 1924, pp. 70–79. General and specific data from many sources on behavior of iron and steel, copper, aluminum, lead, nickel, tin, and zinc, under action of many destructive agencies encountered in industrial world.

Fatigue. An Investigation of the Fatigue of Metals, H. F. Moore and T. M. Jasper. University of Ill.—Bul., vol. 21, no. 39, May 26, 1924, 86 pp., 22 figs. Theory of fatigue of metals; evidence of existence of endurance limit for wrought ferrous metals and of improvement in strength of such metals by cycles of reversed stress at or below that limit; resistance to reversed axial stress (tension-compression); miscellaneous tests and results; resistance to repeated stress other than reversed stress. Bibliography.

Fatigue Phenomena and Endurance Tests (Ermüdungserscheinungen und Dauerversuche), R. Mailänder. Stahl u. Eisen, vol. 44, nos. 21, 22, 23, 24 and 25, May 22, 29, June 5, 12, and 19, 1924, pp. 585–589, 624–629, 657, 661, 684–691 and 719–725, 31 figs. Summarized report of investigations up to end of 1923. Determination of working strength; machines and arrangements for endurance tests; notch action; deformation and hysteresis; fracture. Relations between strength and varying load, various ways of loading, change in strength due to sustained tests, effect of cold working and annealing, composition, structure, etc. Bibliography.

Surfaces, Properties of. The Properties of Metallic Surfaces, J. B. Nevitt. Birmingham Met. Soc.—Jl., vol. 8, no. 10, pp. 425–440 and (discussion) 441–446. Reviews means by which variations in surface conditions may be produced, and outlines effect of these surface conditions upon properties of metal.

MOLDING MACHINES

Applications. Molding Machine Practice, R. R. Clarke. Metal Industry (N. Y.), vol. 22, nos. 6 and 7, June and July, 1924, pp. 237–238 and 272–275, 8 figs. Range of application, difficulties, and solution of difficulties. Describes various methods of pattern mounting.

MOLDS

Drier for Portable Gas. Designs Portable Gas Mold Dryer, A. Zander. Foundry, vol. 52, no. 12, June 15, 1924, p. 482, 2 figs. Apparatus for drying molds with manufactured gas, which is applicable to great variety of work, introduced at Kedzie Foundry Co., Chicago.

Permanent. Discusses Permanent Molds, R. J. Anderson and M. E. Boyd. Foundry, vol. 52, nos. 12 and 13, June 15 and July 1, 1924, pp. 463–468 and 510–513, 17 figs. Describes five different permanent-mold processes and discusses principles involved; typical molds; materials for molds and cores; mold design; methods of gating; various types of commercial alloys and typical castings. Annual exchange paper of Am. Foundrymen's Assn. presented at Inst. Brit. Foundrymen. See also Foundry Trade Jl., vol. 29, nos. 407 and 408, June 5 and 12, 1924, pp. 464–468 and 477–485, 17 figs. Bibliography.

MOTOR BUSES

Six-Wheel. Six-Wheel Bus, Marketed by New Concern, Has Novel Features, H. Chase. Automotive Industries, vol. 51, no. 2, July 10, 1924, pp. 97–100, 9 figs. Particulars of new bus recently announced by a new concern to be known as Six-Wheel Co. of Philadelphia. Easy riding qualities and design which permits all important units to be detached quickly and replaced by spares. Frame of massive and rigid construction. Six-cylinder Continental engine is mounted on rubber blocks.

MOTOR TRUCKS

Electric. A Front-driven Electric Van, W. F. Bradley. Motor Transport (Lond.), vol. 38, no. 1007, June 16, 1924, pp. 745–746, 3 figs. Details of a battery-driven vehicle which is being used in France for load-up to half a ton; presented by Societé d'Applications Electro-Mecaniques; also steered by its front wheels; uses compound-wound electric motor of 4 kw. capacity, capable of taking a temporary overload of 300 per cent.

Maudslay. A 40–50 cwt. Maudslay. Motor Transport (Lond.), vol. 38, no. 1007, June 16, 1924, pp. 741–743, 6 figs. First of a new improved model for goods or passenger transport recently completed at Coventry (Eng.) factory.

Refuse Collector. The Milnes-Daimler Refuse Collector. Motor Transport (Lond.), vol. 38, no. 1009, June 30, 1924, pp. 809–810, 4 figs. Describes 3–4-ton power vehicle designed to work in combination with independent horse-drawn containers.

Steam. Novelty in Steam Waggon Design. Motor Transport (Lond.), vol. 38, no. 1009, June 30, 1924, pp. 787–790, 9 figs. New shaft-driven 6–7 tonner introduced by John Fowler & Co., Eng., having many features new to steam vehicle practice.

Six-Seven Ton Steam Wagon. Engineer, vol. 137, no. 3574, June 27, 1924, pp. 714–715, 4 figs. Details of steam truck which will be shown by John Fowler & Co., Ltd., at Royal Show at Leicester. Is of end-tipping type, designed to carry from 6 to 7 tons and haul a trailer; fitted with rubber tires; boiler is of vertical fire-tube type, devoid of stays, centrally fired, and designed for working pressure of 225 lb. per sq. in.

MOTORCYCLES

Manufacture. Manufacturing a Popular Motor Cycle. Eng. Production, vol. 7, no. 142, July 1924, pp. 208–213, 18 figs. Describes works and methods of Douglas Motors, Ltd., Kingswood, Eng.

Types. International Motorcycle Show in Stuttgart (Germany) (Internationale Motorradausstellung in Stuttgart). Allgemeine Automobil-Zeitung, vol. 25, no. 21, May 24, 1924, pp. 19–21, 21 figs. Description of exhibits.

O

OIL ENGINES

Surface-Ignition. Types of Modern Power-Plant Oil Engines. Oil Engine Power, vol. 2, no. 5, May 1924, pp. 271–272, 3 figs. New model of Italian surface-ignition engine has crosshead and main oiling system entirely separated from cylinder bore, arrangement which results in low lubricating-oil consumption; Corliss-type valve controls admission of scavenging air, amount of which is regulated by governor.

OIL FUEL

Burners. Lighting Oil and Gas Burners, M. H. Mawhinney. Fuels & Furnaces, vol. 2, no. 7, July 1924, pp. 687–688 and 691. Gives general information on lighting different kinds of oil and gas burners.

OIL TANKS

Cushing, Okla. Tankage Installation Holds All Gas from Well to Pipe Line, L. E. Smith. Nat. Petroleum News, vol. 16, no. 28, July 9, 1924, pp. 58–62, 4 figs. Describes system in use in Vida Way lease in north Cushing district of Magnolia Petroleum Co., Okla. From time oil comes from well to time it leaves stock tank to pipe line it is not exposed in any degree to air.

Fire Prevention. Vapor Tight Tanks, Well Vented, Will Reduce Fire Hazard, W. C. Platt. Nat. Petroleum News, vol. 16, no. 22, May 28, 1924, pp. 111–119. Proposed revision of regulations for construction and installation of oil-burning equipments where competent attendant is constantly on premises and for storage and use of oil fuels used therewith; general requirements of piping.

OPEN-HEARTH FURNACES

Design and Calculation. Performance and Efficiency as Fundamentals for the Design and Calculation of Open-Hearth Furnaces (Leistung und Wirkungsgrad als Unterlagen für Bau und Berechnung der Siemens-Martin-Oefen), H. Bansen. Berichte der Fachausschüsse des Vereins deutscher Eisenhüttenleute, Stahlwerksausschuss, report no. 82, May 10, 1924, 23 pp., 19 figs. Functions of furnace; working conditions for temperature drop; heat circulation; relations of fuel supply and preheating to furnace efficiency and fuel consumption; calculation of heat required and efficiency; special means of influencing temperature drop; combustion, temperature conditions and heat transmission; heat accumulators; waste-heat utilization.

Dimensions and Performances. Dimensions and Performances of Open-Hearth Furnaces (Ueber Abmessungen und Leistungen von Siemens-Martin-Oefen), H. Bansen. Berichte der Fachausschüsse des Vereins deutscher Eisenhüttenleute, Stahlwerksausschuss, report no. 81, May 10, 1924, 7 figs. and supp. table, 8 figs. Report on result of questionnaire; includes table showing comparative performance and dimensions of German open-hearth furnaces.

Efficiency. The Efficiency of Open-Hearth Furnaces (Wirkungsgrade im Betriebe des Siemens-Martin-Oefens), G. Bulle. Berichte des Fachausschüsse des Vereins deutscher Eisenhüttenleute, Stahlwekrsausschuss, report no. 80, May 10, 1924, 3 pp. Committee report on metallurgical, furnace and producer performance.

P

PAINTING

Industrial-Plant Practice. Standardization of Painting Practice, R. C. Sheeler. Indus. Mgt. (N. Y.), vol. 68, no. 1, July 1924, pp. 25–28, 5 figs. Extremes of moisture or steam cause all metal surfaces to rust and corrode with extreme rapidity; other surfaces come in contact with gaseous fumes, weak acid vapors, etc. Much money wasted and much good paint condemned through use of wrong material for protective coat to withstand such contact. Discusses application of standardization to maintenance of plant and equipment through proper use of paint and varnish.

PAPER

Area and Weight Standards. Standards for Area, Count and Weight, S. L. Willson. Paper Trade Jl., vol. 79, no. 2, July 10, 1924, pp. 51–54, 58 and 64. Shows that in manufacturing size to-day there is little or no relation to use of paper in this size. Discusses proposed plan of changes and benefits to be derived.

Sizing-Quality Destruction. The Destruction and Restoration of Sizing Quality in Paper, N. D. Ivanov. Paper Trade Jl., vol. 79, no. 2, July 10, 1924, pp. 41–44, 10 figs. Details of experiments made in connection with phenomenon of destruction of sizing quality by sunlight. Translated from Bumazhnaia Promyshlenost (Russia), Dec. 1924, pp. 634–643.

PAPER MACHINERY

Beaters. Modified Beater for Bamboo. Paper, vol. 24, no. 9, June 19, 1924, pp. 379–380, 1 fig. Describes improved machine patented in England by W. A. R. MacRae.

Finishing-Room Machinery. Finishing Room Machinery, O. C. Cordes and W. W. Spratt. Paper, vol. 34, no. 10, June 26, 1924, pp. 422–425, 8 figs. Describes and illustrates operation of calender drives, platers and cutters by Westinghouse dual-frequency system.

High-Speed. High Speed Machine Construction, E. J. Neese. Paper, vol. 34, no. 10, June 26, 1924, pp. 428–431. Increased width and speed of newsprint machines bring many improvements in design and construction.

Wood Grinders. How Caterpillar Grinders Operate. Paper, vol. 34, no. 12, July 10, 1924, pp. 516–517, 8 figs. Essential features of magazine wood grinder invented by P. Priem, Heidenheim, Germany, which is now owned and controlled by Am. Voith Contact Co., Inc., New York. Endless-chain device presses wood laterally as it nears stone, and feed mechanism is driven by fluid motor.

PAPER MANUFACTURE

Beating. New Ideas on Beating, J. W. Brassington. Paper, vol. 34, no. 11, July 3, 1924, pp. 461–464, 3 figs. More speed and less weight of rolls is suggested in describing new type of beater using centrifugal force.

Bibliography. Bibliography of Papermaking for 1923, Compiled by C. J. West. Paper Trade Jl., vol. 78, nos. 17, 18, 19, 20, 21, 22, 23, 24 and 25, Apr. 24, May 1, 8, 15, 22, 29, June 5, 12 and 19, 1924, pp. 52–54, 49–54, 53–56, 49–52, 45–47, 51–52, 55–57, 45–46 and 41–43.

Bleaching Beaters. Function of the Washing Drum, R. Haas. Paper, vol. 34, no. 11, July 3, 1924, pp. 471–475, 6 figs. Determines consumption of energy and best method of operating washing drum of bleaching beater. Translated from Papierfabrikant.

Drying. Methods of Drying Paper, T. J. Keenan. Paper, vol. 34, no. 10, June 26, 1924, pp. 427–428. Principles of drying by steam-heated drums and review of recent novelties and difficulties caused by faulty ventilation.

Centrifugal Force, Application of. Flywheel Power or Centrifugal Force, J. W. Brassington. paper, vol. 34, no. 9, June 19, 1924, pp. 365–367, 2 figs. Possibilities of application of centrifugal force to manufacture of pulp and paper. Now used in a limited way.

PIPE

Intersections, Volumes and Areas of. Formulas for Volumes and Areas of Pipe Intersections, G. Paaswell. Eng. News-Rec., vol. 93, no. 1, July 3, 1924, pp. 28–29, 3 figs. Data covering determination of volumes of cylinder intersections such as those at junction of arches or in special pipe castings.

PIPE, CAST-IRON

Centrifugal. The Manufacture of Centrifugal Cast Iron Pipe. Acetylene Jl., vol. 25, no. 12, June 1924, pp. 590–592, 2 figs. Description of de Lavaud process.

Welding with Bronze. Welding Cast Pipe with Bronze, H. Y. Carson. Iron Trade Rev., vol. 75, no. 2, July 10, 1924, pp. 97–98, 2 figs. In method developed by author for welding cast iron, an ordinary welding rod of tobin bronze is used, joint being preheated by playing an oxy-acetylene flame back and forth transversely across joint area; bronze rod is melted and allowed to flow along joint spreading about one inch in width entirely around pipe. Only moderate temperatures required. Abstract of paper read before Nat. Gas Assn. Am. See also Foundry, vol. 52, no. 12, June 15, 1924, pp. 469–470, 2 figs.

PISTON RINGS

Groove Finishing. Methods of Finishing Piston Ring Grooves. Automotive Mfr., vol. 66, no. 3, June 1924, pp. 15 and 26. Current practice of leading American firms; ordinary formed cutters leave tool marks and result in gas leakage.

PLATES

Flanging Tests. Tests on the Flanging of Thin Plates (Essai d'emboutissage sur tôles minces), M. Guillery. Revue de Métallurgie, vol. 21, no. 5, May 1924, pp. 303–311, 17 figs. Describes two machines for testing thin plate, in order to determine their resistance to cold flanging; method of testing, and results of tests.

PRESSES

Drawing. Press for Motor-cycle Mud Guards. Machy. (Lond.), vol. 24, no. 611, June 12, 1924, p. 348, 1 fig. Double-crank toggle press installed in works of Raleigh Cycle Co., Nottingham, for drawing and forming motorcycle mud guards at one operation.

Hydraulic. Hydraulic Presses and Pumps (Hydraulische Pressen und Pumpen), E. Feyer. Werkstattstechnik, vol. 18, no. 11, June 1, 1924, pp. 289–293, 15 figs. Describes types manufactured by M. Hasse & Co., Berlin, Germany.

Inclinable. Design of Inclinable Power Presses, P. A. Friedell. Machy. (Lond.), vol. 24, no. 613, June 26, 1924, pp. 409–411, 1 fig. Calculations for designing gearing, driving shaft, back-shaft bearing, flywheel and pulleys.

PRESSWORK

Pressed-Metal Production. Pressed-Metal Production. Machy. (Lond.), vol. 24, no. 611, June 12, 1924, pp. 328–331, 6 figs. Practice of Fisher & Ludlow, Birmingham, featuring combination tools, deep-drawn work, and pressings to replace castings.

Pressed-Steel Cycle Parts. Pressed-Steel Cycle Parts. Machy. (Lond.), vol. 24, no. 611, June 12, 1924, pp. 321–327, 17 figs. Replacing castings and machined parts by pressed components; presswork methods employed by Raleigh Cycle Co., Nottingham.

PRODUCER GAS

Combustion, Excess Air Determination in. A Graphical Chart for Determining Excess Air in the Combustion of Producer Gas, G. M. Peltz. Am. Ceramic Soc.—Jl., vol. 7, no. 6, June 1924, pp. 437–441 and (discussion) 441–443, 1 fig. Presents a calculating chart by which it is possible to determine percentage of excess air existing in any producer-gas-fired furnace

Manufactured by Advertisers — CLASSIFIED LIST OF MECHANICAL EQUIPMENT — Alphabetical List on page 148

Pyrometers, Electric
* American Schaeffer & Budenberg Corp'n
* Bristol Co.
* Crosby Steam Gage & Valve Co.
* Superheater Co.
* Taylor Instrument Cos.

Pyrometers, Expansion Stem
* Tagliabue, C. J. Mfg. Co.

Pyrometers, Optical
* Taylor Instrument Cos.

Pyrometers, Pneumatic
* Uehling Instrument Co.

Pyrometers, Radiation
* Taylor Instrument Cos.

Racks, Machine, Cut
* James, D. O. Mfg. Co.
* Jones, W. A. Fdry. & Mach. Co.
Nuttall, R. D. Co.

Radiators, Steam and Water
* American Radiator Co.
* Smith, H. B. Co.

Railways, Industrial
Easton Car & Construction Co.
Link-Belt Co.

Rams, Hydraulic
* Goulds Mfg. Co.
* Worthington Pump & Machinery Corp'n

Receivers, Air
* Ingersoll-Rand Co.
* Scaife, Wm. B. & Sons Co.
* Walsh & Weidner Boiler Co.
* Wheeler Cond. & Engrg. Co.
* Worthington Pump & Machinery Corp'n

Receivers, Ammonia
* Frick Co. (Inc.)

Recorders, CO
* Tagliabue, C. J. Mfg. Co.

Recorders, CO_2
* Tagliabue, C. J. Mfg. Co.

Recorders, SO_2
* Tagliabue, C. J. Mfg. Co.

Recording Instruments
(See Instruments, Recording)

Reducing Motions
* Crosby Steam Gage & Valve Co.

Refractories
* Drake Non-Clinkering Furnace Block Co.
Keystone Refractories Co.
* King Refractories Co. (Inc.)
Maphite Co. of Amer.

Refrigerating Machinery
* De La Vergne Machine Co.
* Frick Co. (Inc.)
* Ingersoll-Rand Co.
Johns-Manville (Inc.)
* Nordberg Mfg. Co.
* Vilter Mfg. Co.
* Vogt, Henry Machine Co.
* Westinghouse Electric & Mfg. Co.

Regulators, Automatic Arc-Furnace
* Westinghouse Elect. & Mfg. Co.

Regulators, Blower
* Foster Engineering Co.
* Mason Regulator Co.

Regulators, Condensation
* Tagliabue, C. J. Mfg. Co.

Regulators, Damper
* Coppus Engineering Corp'n
* Fulton Co.
* Kieley & Mueller (Inc.)
* Mason Regulator Co.

Regulators, Electric
* General Electric Co.
* Westinghouse Electric & Mfg. Co.

Regulators, Fan Engine
* Foster Engineering Co.

Regulators, Feed Water
* Edward Valve & Mfg. Co.
Elliott Co.
* Kieley & Mueller (Inc.)
Squires, C. E. Co.

Regulators, Flow (Steam)
* Schutte & Koerting Co.

Regulators, Humidity
* Fulton Co.
* Tagliabue, C. J. Mfg. Co.

Regulators, Hydraulic Pressure
* Foster Engineering Co.
* Mason Regulator Co.

Regulators, Liquid Level
* Tagliabue, C. J. Mfg. Co.

Regulators, Pressure
* Edward Valve & Mfg. Co.
* Foster Engineering Co.
* Fulton Co.
* General Electric Co.
* Kieley & Mueller (Inc.)
* Mason Regulator Co.
* Tagliabue, C. J. Mfg. Co.
* Taylor Instrument Cos.

Regulators, Pump
(See Governors, Pump)

Regulators, Temperature
* Bristol Co.
* Fulton Co.
* Kieley & Mueller (Inc.)
* Sarco Co. (Inc.)
* Tagliabue, C. J. Mfg. Co.
* Taylor Instrument Cos.

Regulators, Time
* Tagliabue, C. J. Mfg. Co.

Regulators, Vacuum
* Foster Engineering Co.

Resistance Material (Electrical)
Driver-Harris Co.

Revolution Counters
(See Counters, Revolution)

Rings, Weldless
Cann & Saul Steel Co.

Rivet Heaters, Electric
* General Electric Co.

Riveters, Hydraulic
Mackintosh-Hemphill Co.

Riveters, Pneumatic
* Ingersoll-Rand Co.

Riveting Machines
* Long & Allstatter Co.

Roller Bearings
(See Bearings, Roller)

Rolling Mill Machinery
Farrell Foundry & Machine Co.
Mackintosh-Hemphill Co.
Treadwell Engineering Co.

Rolls, Bending
* Niagara Machine & Tool Works

Rolls, Crushing
Farrel Foundry & Machine Co.
Link-Belt Co.
* Worthington Pump & Machinery Corp'n

Rolls, Forming (Sheet Metal)
* Niagara Machine & Tool Wks

Rolls, Rubber
* Goodrich, B. F. Rubber Co.
* United States Rubber Co.

Rolls, Steel
Mackintosh-Hemphill Co.

Roofing
Johns-Manville (Inc.)

Roofing, Asbestos
Johns-Manville (Inc.)

Rope, Hoisting
Clyde Iron Works Sales Co.
* Roebling's, John A. Sons Co.

Rope, Transmission
Hill Clutch Machine & Fdry. Co.
Link-Belt Co.
* Roebling's, John A. Sons Co.

Rope, Wire
Clyde, Iron Works Sales Co.
Hill Clutch Machine & Fdry.Co.
* Roebling's, John A. Sons Co.

Rope Drives
* Allis-Chalmers Mfg. Co.
* Brown, A. & F. Co.
* Falls Clutch & Machinery Co.
Hill Clutch Machine & Fdry. Co.
Link-Belt Co.
* Medart Co.
* Wood's, T. B. Sons Co.

Rubber Goods, Mechanical
* Goodrich, B. F. Rubber Co.
* Jenkins Bros.
* United States Rubber Co.

Rubber Mill Machinery
Farrel Foundry & Machine Co.

Sand Blast Apparatus
* De La Vergne Machine Co.

Saw Mill Machinery
* Allis-Chalmers Mfg. Co.

Saw Mills, Portable
* Frick Co. (Inc.)

Scales, Fluid Pressure
* Crosby Steam Gage & Valve Co.

Screens, Perforated Metal
* Hendrick Mfg. Co.

Screen, Revolving
* Allis-Chalmers Mfg. Co.
Chain Belt Co.
* Gifford-Wood Co.
* Hendrick Mfg. Co.
Link-Belt Co.
* Smidth, F. L. & Co.

Screens, Shaking
* Allis-Chalmers Mfg. Co.
Chain Belt Co.
* Gifford-Wood Co.
* Hendrick Mfg. Co.
Link-Belt Co.

Screens, Water Intake (Traveling)
Chain Belt Co.
Link-Belt Co.

Screw Cutting Dies
(See Dies, Thread Cutting)

Screw Machines, Hand
* Jones & Lamson Mach. Co.
* Warner & Swasey Co.

Screws, Cap
* Scovill Mfg. Co.

Screws, Safety Set
Allen Mfg. Co.
* Bristol Co.

Screws, Set
Allen Mfg. Co.

Separators, Ammonia
* De La Vergne Machine Co.
Elliott Co.
* Frick Co. (Inc.)
* United Machine & Mfg. Co.
* Vogt, Henry Machine Co.

Separators, Compressed Air
* United Machine & Mfg. Co.

Separators, Oil
Bethlehem Shipbldg.Corp'n(Ltd.)
* Cochrane Corp'n
* Crane Co.
* De La Vergne Machine Co.
Elliott Co.
Hoppes Mfg. Co.
* Kieley & Mueller (Inc.)
* United Machine & Mfg. Co.
* Vogt, Henry Machine Co.

Separators, Steam
* Cochrane Corp'n
* Crane Co.
Elliott Co.
Hoppes Mfg. Co.
* Kieley & Mueller (Inc.)
* Pittsburgh Valve, Fdry. & Const. Co.
* United Machine & Mfg. Co.
* Vogt, Henry Machine Co.

Shafting
* Allis-Chalmers Mfg. Co.
* Brown, A. & F. Co.
Cumberland Steel Co.
* Falls Clutch & Mchry. Co.
Hill Clutch Machine & Foundry Co.
* Medart Co.
Union Drawn Steel Co.
* Wood's, T. B. Sons Co.

Shafting, Cold Drawn
Hill Clutch Machine & Fdry. Co.
* Medart Co.

Shafting, Flexible
* Gwilliam Co.

Shafting, Turned and Polished
Cumberland Steel Co.
Hill Clutch Machine & Fdry. Co.
Link-Belt Co.

Shapes, Brick
* McLeod & Henry Co.

Shapes, Cold Drawn Steel
Union Drawn Steel Co.

Shears, Alligator
Farrel Foundry & Machine Co.
* Long & Allstatter Co.
* Royersford Foundry & Machine Co.

Shears, Hydraulic
Mackintosh-Hemphill Co.

Shears, Plate
* Long & Allstatter Co.
Mackintosh-Hemphill Co.

Shears, Rotary
* Niagara Machine & Tool Works

Shears, Squaring.
* Niagara Machine & Tool Wks

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* Brown, A. & F. Co.
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* Falls Clutch & Machinery Co.
Hill Clutch Machine & Fdry. Co.
* Jones, W. A. Fdry. & Mach. Co.
Link-Belt Co.
Mackintosh-Hemphill Co.
* Medart Co.
* Nordberg Mfg. Co.
* Wood's, T. B. Sons Co.

Sheet Metal Work
* Allington & Curtis Mfg. Co.
* Hendrick Mfg. Co.

Sheet Metal Working Machinery
Farrel Foundry & Machine Co.
* Niagara Machine & Tool Works

Sheets, Brass
* Scovill Mfg. Co.

Sheets, Bronze
* Hendrick Mfg. Co.

Sheets, Rubber, Hard
* Goodrich, B. F. Rubber Co.
* United States Rubber Co.

Sheets, Steel
Central Steel Co.

Siphons (Steam-Jet)
* Schutte & Koerting Co.

Slide Rules
Dietzgen, Eugene Co.
Keuffel & Esser Co.
New York Blue Print Paper Co.
ParVell Laboratories
U. S. Blue Co.
Weber, F. Co. (Inc.)

Smoke Recorders
* Sarco Co. (Inc.)

Smoke Stacks and Flues
(See Stacks, Steel)

Sockets, Wire Rope
(See Wire Rope Fastenings)

Soot Blowing Systems
Diamond Power Specialty Corp'n

Space Heaters
* Westinghouse Elec. & Mfg. Co.

Special Machinery
* Brown, A. & F. Co.
* Builders Iron Foundry
* Cramp, Wm. & Sons Ship & Engine Bldg. Co.
Farrel Foundry & Machine Co
* Fawcus Machine Co.
* Franklin Machine Co.
Hill Clutch Machine & Fdry. Co.
Lammert & Mann
Mackintosh-Hemphill Co.
* Nordberg Mfg. Co.
* Smidth, F. L. & Co.
* Vilter Mfg. Co.

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* De Laval Steam Turbine Co.
* Foote Bros. Gear & Machine Co.
* General Electric Co.
Hill Clutch Machine & Foundry Co.
* James, D. O. Mfg. Co.
* Jones, W. A. Fdry. & Mach. Co.
Link-Belt Co.
Palmer-Bee Co.

Spray Cooling Systems
* Cooling Tower Co. (Inc.)

Sprays, Water
* Cooling Tower Co. (Inc.)

Sprinkler Systems
Rockwood Sprinkler Co.

Sprinklers, Spray
* Cooling Tower Co. (Inc.)

Sprockets
Baldwin Chain & Mfg. Co.
* Diamond Chain & Mfg. Co.
* Foote Bros. Gear & Machine Co.
* Gifford-Wood Co.
Hill Clutch Machine & Mfg.Co
Link-Belt Co.
* Medart Co.
Philadelphia Gear Works

Stacks, Steel
* Bigelow Co.
* Casey-Hedges Co.
* Cole, R. D. Mfg. Co.
* Hendrick Mfg. Co.
Morrison Boiler Co.
* Titusville Iron Works Co.
* Union Iron Works
* Vogt, Henry Machine Co.
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Rockwood Sprinkler Co.

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Morrison Boiler Co.
* Walsh & Weidner Boiler Co.

Static Condensers
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* Kieley & Mueller (Inc.)
Lunkenheimer Co.
* Pittsburgh Valve, Fdry. & Const. Co.
* Sarco Co. (Inc.)

Steel, Alloy
Cann & Saul Steel Co.
Central Steel Co.
Union Drawn Steel Co.

Steel, Bar
Cann & Saul Steel Co.
Central Steel Co.

Steel, Bright Finished
Union Drawn Steel Co.

Steel, Chrome
Central Steel Co.

Steel, Chrome Nickel
Central Steel Co.

Steel, Chromium Alloy
Central Steel Co.

*Catalogue data of firms marked * appear in the A.S.M.E. Condensed Catalogues of Mechanical Equipment, 1923-24 Volume*

when analysis of gas and percentage of CO_2 in products of combustion are known.

PULLEYS

Pressed-Steel Belt. Application of Pressed Metal to Pulleys, S. G. Gaillard, Jr. Forging—Stamping—Heat Treating, vol. 10, no. 6, June 1924, pp. 226–229, 12 figs. Various operations in manufacture of pressed-steel belt pulleys.

PULVERIZED COAL

Combustion of. The Combustion of Pulverized Coal, E. Audibert. Colliery Guardian, vol. 127, nos. 3306 and 3307, May 9 and 16, 1924, pp. 1188–1189 and 1251–1252, 4 figs. Details of experiments made by Comité Centrale des Houillères de France, primary object of which is measurement of duration of combustion, and subsidiary object determination of essential conditions for use of a given coal in form of powder. Translated from Revue de l'Industrie Minérale.

Systems. Pulverized-Fuel Systems, A. L. Cole. Power, vol. 59, nos. 23, 24, 25 and 26, June 3, 10, 17 and 24, 1924, pp. 900–905, 16 figs.; 940–945, 17 figs.; 985–988, 16 figs.; and 1022–1027, 26 figs. Different types of equipment in general use for drying, pulverizing, transporting and burning coal in pulverized form. June 3: Types of dryers. June 10: Types of pulverizers used in unit and multiple systems. June 17: Systems used for conveying coal in pulverized form, construction and operation. Type of feeders and burners used with different systems of firing coal in pulverized form; review of earlier types; typical boiler settings designed in last four years.

PUMPS

Air-Lift. Experimental Study of Air Lift Pumps and Application of Results to Design, C. N. Ward and L. H. Kessler. Univ. of Wis.—Bul., Eng. Experiment Station, vol. 9, no. 4, 1924, 166 pp., 60 figs. partly on supp. plates.

Vacuum. An All-metal High-vacuum Pump System, I. Backhurst and G. W. C. Kaye. Lond., Edinburgh & Dublin Philosophical Mag. & Jl. Sie., vol. 47, no. 281, May 1924, pp. 918–929, 3 figs. Describes pump system of two-stage type, constructed wholly of metal and consisting of (1) mercury-vapor jet pump in series with (2) mercury-vapor condensation pump; advantages of system. Bibliography. See also paper by same authors, entitled, A Metal Annular-Jet Vacuum Pump, describing modification of pump described in first paper, pp. 1016–1020, 2 figs.

PUMPS, CENTRIFUGAL

Flow Phenomena in. Experimental Investigation of Flow of Water Through a Turbine Acting as Centrifugal Pump (Experimentelle Untersuchung der Wasserströmung durch ein rotierendes Zellen-Kreiselrad), H. Oertli. Schweizerische Bauzeitung, vol. 83, no. 20, May 17, 1924, pp. 231–234, 13 figs. Results of tests to investigate flow phenomena in rotary water wheel.

Internal Leakage. Determination of Internal Leakage in Centrifugal Pumps, A. F. Sherzer. Eng. News-Rec., vol. 92, no. 25, June 19, 1924, pp. 1056–1058, 5 figs. Facts regarding coefficient of discharge established by research in hydraulic laboratory of Univ. of Mich.

Suction Pipes, Evacuating. Evacuating the Suction Pipes of Centrifugal Pumps, W. S. Douglas. Power Engr., vol. 19, no. 219, June 1924, pp. 205–207, 4 figs. Study of conditions obtaining during process; develops formulas for predetermination of pump capacities, etc., for given plants.

R

RAILLESS TRACTION

Rochester, N. Y. Rochester Trackless Trolley Construction. Elec. Ry. Jl., vol. 64, no. 1, July 5, 1924, pp. 11–13, 4 figs. Line is about 3 mi. long and runs through densely populated district; it crosses five electric-car lines and one steam railroad at grade; some of overhead equipment is of special design.

RAILS

Frogs and Crossings, Finishing of. Finishing Steel Track Equipment, F. B. Jacobs. Iron Trade Rev., vol. 74, no. 26, June 26, 1924, pp. 1701–1702, 3 figs. Notes on methods and equipment used at plant of Indianapolis Switch & Frog Co., Springfield, O., in production of solid manganese-steel frogs, switches and crossings.

Quality Improvement. How the Quality of Rails Can Be Improved, C. W. Gennet, Jr. Ry. Age, vol. 77, no. 2, July 12, 1924, pp. 63–65, 2 figs. Suggestions for changes in specifications to secure a better grade of steel.

RAILWAY ELECTRIFICATION

France. Paris Suburban Lines Electrification. Elec. Ry. & Tramway Jl., vol. 49, no. 1206, Oct. 12, 1923, and vol. 50, no. 1219, Jan. 11, 1924, pp. 201–205 and 19–22, 14 figs. Changes in construction and general arrangement of St. Lazare station; describes electric motor car to be used on State Rys., designed so as to allow of reduction to a strict minimum of stopping time at stations.

Illinois Central. Electrification Progress on the I. C. R. R. Elec. Traction, vol. 20, no. 6, June 1924, pp. 256–257, 4 figs. Work on complete elimination of grade crossings from Chicago to Kankakee are well under way; next cars purchased will be completely equipped for electrical operation.

Switzerland. Railway Electrification Progress in Switzerland, A. Rohn. Eng. News-Rec., vol. 93, no. 1, July 3, 1924, pp. 18–19, 4 figs. Progress of electrification movement of Swiss Federal Railways. More than 400 km. of lines operating by electric power; will equip 1150 km. in next four years.

United States. The Electrification of Foreign Railways including Recent Developments and Projects, S. Parker Smith. World Power, vol. 1, no. 6, June 1924, pp. 338–346, 4 figs. United States of America.

RAILWAY MANAGEMENT

Purchases and Stores. Purchases and Stores. Ry. Age (Daily Edition), vol. 76, no. 34, June 17, 1924, pp. 1641–1659, 6 figs. Contains following articles: Purchasing Function of the Government, H. C. Smither; Committee recommendation: Stores Department Book of Rules; Method for Material Procurement, E. J. Remensnyder; Committee report on Material Accounting and Office Appliances; report of Committee on General Accounting; Bonus System for Efficient Stockmen, J. E. Mahaney; Report on Department Buildings and Facilities; Duties of a Traveling Storekeeper, W. Dixon; and other addresses. Papers and reports presented before Am. Ry. Assn. See also Ry. Rev., vol. 74, no. 25, June 21, 1924, pp. 1204–1211.

S. P. Houston Store Has Many Fine Features. Ry. Rev., vol. 74, no. 24, June 14, 1924, pp. 1094–1103, 22 figs. Among practices followed at purchases and stores department of Southern Pac. Co., are unit piling of materials, stores delivery and supply-train operation.

Material Investment. The Railways' Material Investment, L. C. Thomson. Can. Ry. Club, vol. 23, no. 3, Mar. 1924, pp. 20–29 and (discussion) 29–38. Deals with organization, facilities, inspection, distribution, rail, and reclamation.

Tonnage Volume, Forecasting. Railroad Traffic and the Business Cycle, H. B. Vanderblue. Ry. Age, vol. 76, no. 20, Apr. 19, 1924, pp. 987–990, 7 figs. Shows how individual carrier is assisted in forecasting tonnage volume; traffic of Southern Ry.

Supervisory Forces, Training of. Proper Training of Shop Supervisory Forces, L. W. Baldwin. Ry. Rev., vol. 74, no. 26, June 28, 1924, pp. 1256–1258. Discusses training of supervision and developing of men better fitted for mechanical positions. Systematic record of progressive steps should be kept and stipulated examinations at stated intervals should be given. From paper read before Am. Ry. Assn. annual convention.

RAILWAY MOTOR CARS

Drewry. Drewry Motor Rail Vehicles. Motor Transport (Lond.), vol. 38, no. 1008, June 23, 1924, pp. 769–770, 4 figs. Three representative types for inspection and haulage work which were shown at British Empire exhibition.

Hydraulic-Drive. Gasoline Passenger Car with Hydraulic Drive. Ry. Age, vol. 76, no. 31, June 14, 1924, pp. 1507–1509, 5 figs. Combination passenger and baggage unit car propelled by 150-hp. Ricardo engine through transmission consisting of one hydraulic variable-delivery pump and two hydraulic variable-speed motors; in operation on New York, New Haven & Hartford.

Italy. Italians Build Railcars to Meet Motor Bus Competition, F. A. Shepley. Automotive Industries, vol. 50, no. 25, June 19, 1924, pp. 1319–1320, 1 fig. Fitted with two 60-hp. engines, Westinghouse electrical equipment and air brakes; gear sets used provide four forward and reverse speeds of which maximum is 32 m.p.h.

RAILWAY OPERATION

Car Switching. Switching Devices (Hilfsmittel zum Verschieben), Wernekke. Fördertechnik u. Frachtverkehr, vol. 17, no. 8, Apr. 30, 1924, pp. 103–105, 6 figs. Various devices for switching railway cars by means of wire ropes; for use in cases where use of switching locomotives would not be economical. Types of electric motors and controllers for devices.

RAILWAY REPAIR SHOPS

Delivery System. Transportation of Material in the Roanoke Shops, Jas. M. Thomas. Ry. Rev., vol. 74, no. 24, June 14, 1924, pp. 1126–1130, 9 figs. Describes delivery system of shops of Norfolk & West. Ry.; how materials are delivered to and from shops and yards; organization and system; schedules maintained and equipment used.

Design. Report on Design of Shops and Engine Terminals. Ry. Age, vol. 76, no. 30, June 13, 1924, pp. 1464–1468. Seven specific recommendations for freight-car and repair shops. Am. Ry. Assn. committee report and discussion.

Grand Rapids, Mich. How the Grand Rapids Shops were Modernized. Ry. Age, vol. 76, no. 31, June 14, 1924, pp. 1497–1502, 9 figs. Details of reconstruction of general repair shops of Pere Marquette plant; method of handling locomotive repairs; improved arrangement of car-repair shops; power plant. See also Ry. Rev., vol. 74, no. 24, June 14, 1924, pp. 1108–1119, 16 figs.

RAILWAY SHOPS

Car-Building. Car Building Program in a Railroad Shop. Ry. Rev., vol. 74, no. 25, June 21, 1924, pp. 1177–1185, 19 figs. Describes production activities introduced in new Wyoming car shops of Pere Marquette Ry. at Grand Rapids, Mich., where 300 refrigerator cars are being built after production schedule at rate of $2^1/_2$ cars per day.

Central of Georgia Ry. A Good Railway Shop in the South, F. H. Colvin. Am. Mach., vol. 61, no. 1, July 3, 1924, pp. 5–6, 5 figs. A few methods found in a well-equipped shop of an old railroad, the Central of Georgia, at Macon.

Equipment Standardization. Standardized Shop Work at Topeka, F. H. Colvin. Am. Mach., vol. 61, no. 2, July 10, 1924, pp. 63–64, 1 fig. Outline of how equipment is standardized and manufactured at Topeka shops of Santa Fe, and economies effected by standardization.

Kansas City Southern Ry. Kansas City Southern Enlarges Its Main Shops. Ry. Age, vol. 76, no. 38, June 28, 1924, pp. 1807–1181, 10 figs. Extensions at Pittsburg, Kan., which enable boiler, blacksmith and erecting shops to be consolidated.

Machine Tools for. Machine Tools for Railway Shops. Ry. Engr., vol. 45, nos. 532 and 533, May and June, 1924, pp. 171–173, and 204–206, 8 figs. Boring and turning mills; extra-heavy wheel lathe; cylinder grinding machine; boring rolling-stock wheels; drilling and ovaling rails; boring axle-boxes; new boiler-shop tool; car-wheel-center boring machine.

Training of Forces. The Training of Shop Supervisory Forces, L. W. Baldwin. Ry. Age (Daily Edition), vol. 76, no. 34, June 17, 1924, pp. 1627–1630. Selection of apprentices; supervision and encouragement of mechanic; selecting men for promotion; duties of foreman; study of new tools and appliances. Address before Am. Ry. Assn.

RAILWAY SIGNALING

Colored-Light Signals. Canadian National Color-Light Signals, T. A. Allen. Ry. Signaling, vol. 17, no. 7, July 1924, pp. 268–270, 6 figs. Expanded steel trusses in place of bridges save money; main line switches electrically lighted.

Interlocking. New Interlocking Construction Ideas, J. E. Jacobs. Ry. Signaling, vol. 17, no. 7, July 1924, pp. 271–274, 13 figs. Chicago & West Indiana installs 120-lever plant using park-way cable, unique outlets and novel charging apparatus.

Neon, Application in. Neon—A New Gas for Electrical Use, C. S. Treacy. Ry. Signaling, vol. 17, no. 7, July 1924, pp. 279–280, 1 fig. Development of new gas and its application to signal lights and lightning arresters.

RAILWAY TIES

Treated vs. Untreated. Superiority of Treated Ties Proved by a Nine Years' Test on Chicago & North Western Railway. Wood Preserving News, vol. 2, no. 5, May 1924, pp. 72–73. Seven varieties of timber, untreated and treated by three standard processes, installed on eight divisions show great economy of tie preservation.

RAILWAY TRACK

Crossing Gates. Electrically Operated Gates at Mount Pleasant Crossing, Southampton, Southern Railway, W. J. Thorrowgood. Ry. Gaz., vol. 40, no. 25, June 20, 1924, pp. 379–882, 4 figs. Results of power tests of gates; describes operating mechanism; emergency arrangements.

Stress on, Relation to Locomotive Design. Relation of Track Stress to Locomotive Design, C. T. Ripley. Ry. Age (Daily Edition), vol. 76, no. 32, June 14, 1924, pp. 1457–1553 and (discussion) 1553–1558, 10 figs. History of study of track stresses; describes stremmatograph and its use in measuring rail stresses and gives results of number of tests run on A. T. & S. F. Paper read before Am. Ry. Assn.

Water-Supply Stations. Santa Fe Builds New Water Stations Where Supply Is Limited, E. H. Olson. Ry. Eng. & Maintenance, vol. 20, no. 7, July 1924, pp. 268–272, 12 figs. Description of two water stations, one at Bazar, and second at Aikman, having pumping capacities of 550 ga. per min., built to increase water supply because of new low-grade cut-off line from Ellinor, Kan., to Eldorado.

RAILWAY YARDS

Freight. Markham Yard, W. P. Cronican. West. Soc. Engrs.—Jl., vol. 29, no. 6, June 1924, pp. 257–262. Principal features of design of new classification yard of Ill. Central R. R. Co. Will handle practically all freight entering or leaving Chicago district. See also paper by A. Bernard giving operating features, pp. 263–264.

Flood Lighting. Floodlighting Railroad Yards, E. G. McAllister. Elec. World, vol. 83, no. 26, June 28, 1924, pp. 1329–1332, 6 figs. Adoption of this practice has materially increased operating efficiency and safety on Norfolk & West. R. R.; details of installation; costs and operating results.

RAILWAYS

Government Regulation. The Development of Railroad Regulation, F. McManamy. Ry. Age (Daily Edition), vol. 76, no. 34, June 17, 1924, pp. 1623–1627. Review of scope and effect of what U. S. Government has done in way of legislation affecting railroads; unification; provisions to stabilize credit. Paper read before Am. Ry. Assn.

Materials Specifications. Report on Specifications and Tests for Materials. Ry. Age (Daily Edition), vol. 76, no. 34, June 17, 1924, pp. 1638–1639, 1 fig. New proposed form for specification of welding wire and rods; specifications for lumber; etc. Report presented to Am. Ry. Assn.

REAMERS

Taper. Taper Machine Reamers, F. Cooke. Machy. (Lond.), vol. 24, no. 613, June 26, 1924, pp. 385–388, 8 figs. Deals with back piloting roughing reamers and finishing reamers; gives dimensions and formulas.

REFRIGERATING MACHINES

CO_2 Compressors. The Carbon Dioxide Compressor, H. J. Macintire. Refrig. Wld., vol. 69, no. 6, June 1924, pp. 16–18, 2 figs. Improvements in recent years have followed along same lines as in ammonia-compressor design.

Precooling in. Pre-Cooling by Primary Evaporation and Multiple Effect Compression, as Applied to CO_2 Refrigerating Machines, Henry Brier. Cold

Manufactured by Advertisers

CLASSIFIED LIST OF MECHANICAL EQUIPMENT

Alphabetical List on page 148

Steel, Cold Drawn
Union Drawn Steel Co.

Steel, Cold Rolled
Cumberland Steel Co.
Union Drawn Steel Co.

Steel, Hot Rolled
Central Steel Co.

Steel, Molybdenum
Central Steel Co.

Steel, Nickel
Central Steel Co.
Union Drawn Steel Co.

Steel, Open-Hearth
* Falk Corporation
Union Drawn Steel Co.

Steel, Rock Drill
* Ingersoll-Rand Co.

Steel, Screw, Cold Drawn
Union Drawn Steel Co.

Steel, Spring
Central Steel Co.

Steel, Strip (Cold Rolled)
Driver-Harris Co.

Steel, Tool
Cann & Saul Steel Co.

Steel, Vanadium
Central Steel Co.
Union Drawn Steel Co.

Steel Plate Construction
Bethlehem Shipbldg.Corp'n(Ltd.)
* Bigelow Co.
* Burhorn, Edwin Co.
* Casey-Hedges Co.
* Cole, R. D. Mfg. Co.
* Graver Corp'n
* Hendrick Mfg. Co.
* Keeler, E. Co.
Morrison Boiler Co.
Steere Engineering Co.
* Titusville Iron Works Co.
* Union Iron Works
* Vogt, Henry Machine Co.
* Walsh & Weidner Boiler Co.

Steps, Ladder & Stair (Non-Slipping)
* Irving Iron Works Co.

Stills
* Vogt, Henry Machine Co.

Stocks and Dies
* Landis Machine Co. (Inc.)

Stokers, Chain Grate
* Babcock & Wilcox Co.
* Combustion Engineering Corp'n
* Westinghouse Electric & Mfg. Co.

Stokers, Overfeed
* Detroit Stoker Co.
* Riley, Sanford Stoker Co.
* Westinghouse Electric & Mfg. Co.

Stokers, Traveling Grate, Anthracite
* United Machine & Mfg. Co.

Stokers, Underfeed
* American Engineering Co.
* Combustion Engineering Corp'n
* Detroit Stoker Co.
* Riley, Sanford Stoker Co.
* Sturtevant, B. F. Co.
* United Machine & Mfg. Co.
* Westinghouse Electric & Mfg. Co.

Strainers, Oil
* Bowser, S. F. & Co. (Inc.)
* Mason Regulator Co.

Strainers, Steam
* Foster Engineering Co.
* Kieley & Mueller (Inc.)
* Mason Regulator Co.

Strainers, Water
Elliott Co.
* Foster Engineering Co.
Golden-Anderson Valve Specialty Co.
* Kieley & Mueller (Inc.)
* Mason Regulator Co.
* Schutte & Koerting Co.

Strainers, Water (Traveling)
Link-Belt Co.

Structural Steel Work
* Hendrick Mfg. Co.
* Walsh & Weidner Boiler Co.

Sugar Machinery
Farrel Foundry & Machine Co.
* Walsh & Weidner Boiler Co.

Superheaters, Steam
* Babcock & Wilcox Co.
* Power Specialty Co.
* Superheater Co.

Superheaters, Steam (Locomotive)
* Power Specialty Co.
* Superheater Co.

Superheaters, Steam (Marine)
* Power Specialty Co.
* Superheater Co.

Switchboards
* General Electric Co.
* Westinghouse Electric & Mfg. Co.

Switches, Electric
* General Electric Co.
* Westinghouse Electric & Mfg. Co.

Synchronous Converters
(See Converters, Synchronous)

Tables, Drawing
Dietzgen, Eugene Co.
Economy Drawing Table & Mfg. Co.
Keuffel & Esser Co.
New York Blue Print Paper Co.
ParVell Laboratories
U. S. Blue Co.
Weber, F. Co. (Inc.)

Tachometers
* American Schaeffer & Budenberg Corp'n
* Bristol Co.
Veeder Mfg. Co.

Tachoscopes
* American Schaeffer & Budenberg Corp'n

Tanks, Acid
* Graver Corp'n
* Walsh & Weidner Boiler Co.

Tanks, Ice
* Frick Co. (Inc.)
* Graver Corp'n

Tanks, Oil
* Graver Corp'n
* Hendrick Mfg. Co.
Morrison Boiler Co.
* Scaife, Wm. B. & Sons Co.
* Titusville Iron Works Co.
* Walsh & Weidner Boiler Co.

Tanks, Pressure
* Graver, Corp'n
* Hendrick Mfg. Co.
* Ingersoll-Rand Co.
Morrison Boiler Co.
* Titusville Iron Works Co.
* Vogt, Henry Machine Co.
* Walsh & Weidner Boiler Co.

Tanks, Steel
Bethlehem Shipbldg.Corp'n(Ltd.)
* Bigelow Co.
* Casey-Hedges Co.
* Cole, R. D. Mfg. Co.
* Graver Corp'n
* Hendrick Mfg. Co.
Morrison Boiler Co.
* Scaife, Wm. B. & Sons Co.
* Titusville Iron Works Co.
* Union Iron Works
* Vogt, Henry Machine Co.
* Walsh & Weidner Boiler Co.

Tanks, Storage
* Cochrane Corp'n
* Cole, R. D. Mfg. Co.
* Combustion, Engineering Corp'n
* Graver Corp'n
* Hendrick Mfg. Co.
Morrison Boiler Co.
* Scaife, Wm. B. & Sons Co.
* Titusville Iron Works Co.
* Vogt, Henry Machine Co.
* Walsh & Weidner Boiler Co.

Tanks, Tower
* Graver Corp'n
* Walsh & Weidner Boiler Co.

Tanks, Welded
* Cole, R. D. Mfg. Co.
* Graver Corp'n
Morrison Boiler Co.
* Scaife, Wm. B. & Sons Co.

Tap Extensions
Allen Mfg. Co.

Tapping Attachments
* Whitney Mfg. Co.

Temperature Regulators
(See Regulators, Temperature)

Testing Laboratories, Cement
* Smidth, F. L. & Co.

Textile Machinery
* Franklin Machine Co.
* Tolhurst Machine Wks

Thermometers
* American Schaeffer & Budenberg Corp'n
* Ashton Valve Co.
* Bristol Co.
* Sarco Co. (Inc.)
* Tagliabue, C. J. Mfg. Co.
* Taylor Instrument Cos.

Thermometers, Chemical
* Tagliabue, C. J. Mfg. Co.

Thermometers, Distance
* Taylor Instrument Cos.

Thermometers, High Range (Recording)
* Bailey Meter Co.
* Tagliabue, C. J. Mfg. Co.
* Taylor Instrument Cos.

Thermometers, Industrial
* Tagliabue, C. J. Mfg. Co.

Thermostats
* Bristol Co.
* Fulton Co.
* General Electric Co.

Thread Cutting Tools
* Crane Co.
* Jones & Lamson Machine Co.
* Landis Machine Co. (Inc.)

Threading Machines, Pipe
* Landis Machine Co. (Inc.)

Tie Tamping Outfits
* Ingersoll-Rand Co.

Time Recorders
* Bristol Co.

Tinsmiths' Tools and Machines
* Niagara Machine & Tool Works

Tipples, Steel
Link-Belt Co.

Tools, Brass-Working Machine
* Warner & Swasey Co.

Tools, Machinist's Small
* Atlas Ball Co.

Tools, Pneumatic
* Ingersoll-Rand Co.

Tracks, Industrial Railway
Easton Car & Construction Co.

Tracks, Overhead
Palmer-Bee Co.

Tractors
* Allis-Chalmers Mfg. Co.

Tractors, Industrial (Storage Battery)
* Yale & Towne Mfg. Co.

Tractors, Turntable
* Whiting Corp'n

Trailers, Industrial
* Yale & Towne Mfg. Co

Tramrail Systems, Overhead
* Brown Hoisting Machinery Co.
Link-Belt Co.
* Whiting Corp'n

Tramways, Bridge
Link-Belt Co.

Tramways, Wire Rope
Clyde Iron Works Sales Co.
Lidgerwood Mfg. Co.
* Roebling's, John A. Sons Co.

Transfer Tables
* Whiting Corp'n

Transformers, Electric
* Allis-Chalmers Mfg. Co.
* General Electric Co.
* Westinghouse Electric & Mfg. Co.

Transmission Machinery
(See Power Transmission Machinery)

Transmissions, Automobile
* Foote Bros. Gear & Machine Co.

Transmissions, Variable Speed
* American Fluid Motors Co.
* Foote Bros. Gear & Machine Co.

Traps, Radiator
* American Radiator Co.
* Sarco Co. (Inc.)

Traps, Return
* American Blower Co.
* Crane Co.
* Kieley & Mueller (Inc.)

Traps, Steam
* American Blower Co.
* American Schaeffer & Budenberg Corp'n
* Crane Co.
Elliott Co.
Golden-Anderson Valve Specialty Co.
* Jenkins Bros.
Johns-Manville (Inc.)
* Kieley & Mueller (Inc.)
* Reading Steel Casting Co. (Inc.)
(Pratt & Cady Division)
* Sarco Co. (Inc.)
* Schutte & Koerting Co.
Squires, C. E. Co.
* Vogt, Henry Machine Co.

Traps, Vacuum
* American Blower Co.
* American Schaeffer & Budenberg Corp'n
* Crane Co.
* Sarco Co. (Inc.)

Treads
* Irving Iron Works Co.

Treads, Stair (Rubber)
* United States Rubber Co.

Trolleys
* Brown Hoisting Machines Co.
* Whiting Corp'n

Trolleys, Monorail
Palmer-Bee Co.

Trucks, Industrial (Storage Battery)
* Yale & Towne Mfg. Co.

Trucks, Trailer
* Yale & Towne Mfg. Co.

Tubes, Boiler, Seamless Steel
* Casey-Hedges Co.

Tubes, Condenser
* Scovill Mfg. Co.
* Wheeler Condenser & Engrg. Co

Tubes, Pitot
* American Blower Co.
Bacharach Industrial Instrument Co.

Tubing, Rubber
* Goodrich, B. F. Rubber Co.
* United States Rubber Co.

Tubing, Rubber (Hard)
* Goodrich, B. F. Rubber Co.

Tumbling Barrels
Farrel Foundry & Machine Co.
* Royersford Fdry. & Mach. Co
* Whiting Corp'n

Turbines, Hydraulic
* Allis-Chalmers Mfg. Co.
* Cramp, Wm. & Sons Ship & Engine Bldg. Co.
Hoppes Water Wheel Co.
* Leffel, James & Co.
Newport News Shipbuilding & Dry Dock Co.
Smith, S. Morgan Co.
* Worthington Pump & Mchry. Corp'n

Turbines, Steam
* Allis-Chalmers Mfg. Co.
* Coppus Engineering Corp'n
* De Laval Steam Turbine Co.
* General Electric Co.
* Kerr Turbine Co.
Ridgway Dynamo & Engine Co.
* Sturtevant, B. F. Co.
* Terry Steam Turbine Co.
* Westinghouse Elec. & Mfg. Co
* Wheeler Condenser & Engrg. Co

Turbo-Blowers
* Coppus Engineering Corp'n
* General Electric Co.
* Ingersoll-Rand Co.
* Kerr Turbine Co.
* Sturtevant, B. F. Co.

Turbo-Compressors
* Ingersoll-Rand Co.

Turbo-Generators
* Allis-Chalmers Mfg. Co.
* De Laval Steam Turbine Co.
* General Electric Co.
* Kerr Turbine Co.
Ridgway Dynamo & Engine Co
* Sturtevant, B. F. Co.
* Terry Steam Turbine Co.
* Westinghouse Electric & Mfg. Co.

Turbo-Pumps
Bethlehem Shipbldg. Corp'n (Ltd)
* Coppus Engineering Corp'n
* Kerr Turbine Co.
* Terry Steam Turbine Co.
* Wheeler Condenser & Engineering Co.

Turntables
Easton Car & Construction Co.
Link-Belt Co.
Palmer-Bee Co.
* Whiting Corp'n

Turret Machines
(See Lathes, Turret)

Unions
* Crane Co.
* Edward Valve & Mfg. Co.
Lunkenheimer Co.
* Pittsburgh Valve, Fdry. & Const. Co.
* Vogt, Henry Machine Co.

Unions, Pressed Steel
Rockwood Sprinkler Co.

Unloaders, Air Compressor
* Ingersoll-Rand Co.
* Worthington Pump & Machinery Corp'n

Unloaders, Ballast
Lidgerwood Mfg. Co.

Unloaders, Car
* Gifford-Wood Co.
Link-Belt Co.

Vacuum Breakers
* Foster Engineering Co.

Vacuum Dryers, Pans, Pumps, Traps, etc.
(See Pans, Pumps, Traps, etc., Vacuum)

Valve Discs
* Edward Valve & Mfg. Co.
Garlock Packing Co.
* Goodrich, B. F. Rubber Co.

*Catalogue data of firms marked * appear in the A.S.M.E. Condensed Catalogues of Mechanical Equipment, 1923-24 Volume*

Storage, vol. 27, no. 315, June 19, 1924, pp. 246–248, 6 figs. Shows that multiple-effect compression is pre-eminently suited for dealing satisfactorily with two evaporations in closed cycle of CO_2 refrigerating plant arranged for precooling by partial or primary evaporation.

REFRIGERATION

Brine and Direct-Expansion Cooling. Comparison of Direct Expansion and Brine in Applying Refrigeration, H. J. Macintire. Chem. & Met. Eng., vol. 30, no. 26, June 30, 1924, pp. 1027–1029, 4 figs. Conditions governing application of cooling by two methods, with particular emphasis on brine cooling.

RIVETED JOINTS

Stresses in. Stresses in the Riveted Joints of Steel Structures (Die Beanspruchung des Nietverbindungen bei Eisenkonstruktionen), Möllenhoff. Zentralblatt der Bauverwaltung, vol. 43, nos. 101/102, Dec. 19, 1923, pp. 607–611, 13 figs. Theoretical investigations and scientific measurements of stresses occurring. Great influence of quality of workmanship is emphasized.

RIVETING

Machines for. Giant Portable Compressed Air Riveting Machine, J. C. Hanna. Compreesed Air Mag., vol. 29, no. 5, May 1924, pp. 861–863, 4 figs. Description of 150-ton riveter designed and manufactured by Hanna Eng. Wks., Chicago, Ill.; makes use of compressed air in forming rivet heads, and compressed air is also drawn upon in rotating machine as well as in tilting it. Character of work that it performs.

ROLLING MILLS

Butt-Weld. New Butt Weld Mills at Indiana Harbor. Iron Age, vol. 914, no. 1, July 3, 1924, pp. 1-4, 5 figs. Mills, which are part of expansion program of Youngstown Sheet & Tube Co., will roll pipe from ⅛ up to 3 in. and will produce 400 tons daily.

Plate Mills. New Three-high Plate Mill at the Clydebridge Works of Messrs. David Colville & Sons, Ltd. English Elec. Jl., vol. 2, no. 6, Apr. 1924, pp. 311-319, 8 figs. Ilgner drive with slow-speed motor direct-coupled to mill and flywheel energy embodied in a separate motor-generator equalizer set. Plant designed to deal with 3000 tons of plates per week.

Power Consumed in Rolling Steel. Power Consumed in Rolling Steel, Iron Age, vol. 113, no. 22, May 29, 1924, pp. 1564–1565, 1 fig.; and Iron Trade Rev., vol. 74, no. 22, May 29, 1924, pp. 1431–1433, 5 figs. Factors governing amount of power required for rolling steel; graphical presentation of power consumption as related to displacement of metal; load variation contingent upon rolling temperature.

S

SAND BLAST

Sands for. Sand Blast Sand, W. M. Weigel. U. S. Bur. Mines, Reports of Investigations, no. 2615, June 1924, 6 pp. Discusses different grades of sand, mining and preparation, and utilization of waste blast sand.

SAND, MOLDING

Reclamation Tests. Reports on Sand Reclamation Tests. Foundry, vol. 52, no. 12, June 15, 1924, pp. 470–471. (Abstract.) Progress report of committee of Am. Foundrymen's Assn.

Steel Castings. Moulding Sands for Steel Castings, A. Rhydderch. Foundry Trade Jl., vol. 29, nos. 406 and 407, May 29 and June 5, 1924, pp. 445–448 and 460–463, 6 figs. Refractoriness, naturally-bonded sand, examination of clay grades, stripping properties of sands, "compos," mechanical strength and permeability, controlling variables, standardization of testing methods, preparation, strength as affected by milling, drying of sands and compo molds, etc.

Testing. Notes Sand Test Methods, C. W. H. Holmes. Foundry, vol. 52, nos. 10 and 11, May 15 and June 1, 1924, pp. 385–388 and 435–438, 1 fig. May 15: Discusses formation of sand and chemical, mineral and mechanical properties most desired for molding purposes; nature of bond. June 1: Results obtained with sieve test and elutriator compared, with special reference to distribution of bond; selecting and standardizing tests. (Abstract.) Paper presented at Paris Mtg. of Int. Foundry Congress.

The Testing of Molding Sands, H. Ries. Sibley Jl. Eng., vol. 38, no. 6, June 1924, pp. 136–138 and 156, 5 figs. Describes three tests thus far adopted, namely permeability, bonding-strength, and fineness test.

SAWS

Circular. Recent Investigations of Cold Circular Sawing Machines and Circular Saw Blades (Neuere Untersuchungen an Kaltkreissägemaschinen und Kreissägeblättern), A. Stotz. Maschinenbau, vol. 3, no. 12, Mar. 27, 1924, pp. 404–408, 14 figs. Results of investigations demonstrate superiority of rapid blades over tool-steel full blades, and also show that cold circular saws can compete successfully with ripping process by means of toothless friction saws.

SCREWS

Lead Screws, Chasing. Chasing Lead-screws, Chas. O. Herb. Machy. (N. Y.), vol. 30, no. 11, July 1924, pp. 883–884, 2 figs. Practice of Am. Tool Works Co.

SCREW THREADS

Rolling. Rolling Threads on Thin Brass Shells, W. P. Doolittle. Am. Mach., vol. 60, no. 22, May 29, 1924, pp. 793–794, 8 figs. Causes of troubles experienced in holding work to plug, or ring, thread gage, tools for thread rolling and beading.

SILICON STEEL

Annealing, Effect of. Effect of Annealing on the Magnetic Properties of Sheets of Silicon Steel Employed in Electrical Construction (Influence du recuit sur les propriétés magnétiques des tôles au silicium employées dans la construction électrique), R. Cazaud. Académie des Sciences—Comptes Rendus des Seances, vol. 178, no. 20, May 12, 1924, pp. 1610–1611. Results of a study of effect of varying conditions of annealing of rolled sheets of steel containing various percentages of silicon, on magnetic permeability, hysteresis losses, reluctivity, and Foucault losses.

SMOKE

Filtration of. Electrical Smoke Filtration (Elektrisk gasrening, Cottrell-Möllers metod), Ake Dahlgren. Teknisk Tidskrift, vol. 54, no. 19, May 10, 1924, pp. 34–38 (Kemi), 11 figs. Historical review of development of art of smoke filtration and detailed description of electrical method proposed by Cottrell and a later improved upon by Möller. Number of photographs and figures showing recent installations in Europe.

SOLIDS

Internal Pressures of. The Internal Pressures of Solids, T. W. Richards. Am. Chem. Soc.—Jl., vol. 46, no. 6, June 1924, pp. 1419–1436, 1 fig. Brief analysis of nature of an approximate hyperbolic pressure-volume equation for solids; relation of this hyperbolic equation to an equation of state, in which each of the quantities has definite physical meaning; method which gives a plausible means of calculating internal pressure of isotropic elements from coefficient of expansion by means of a certain equation.

STANDARDS

German N. D. I. Reports. Report of the German Industrial Standards Committee (Normenausschuss der Deutschen Industrie). Maschinenbau, vol. 3, no. 17, June 12, 1924, pp. N 109–116, 14 figs. Proposals for rope sheaves for hoisting machinery, pipe threads, screwed pipe couplings, screw caps.

STEAM

Pressure Equation. Steam Pressure Equation at Low Temperature (Uber die Dampfspannungsgleichung bei tiefen Temperaturen), V. Fischer. Zeit. für technische Physik, vol. 5, no. 5, 1924, pp. 187–192. Deduction of equation by means of Maclaurin series.

Specific Heat. The Specific Heat of Steam, H. L. Callendar. World Power, vol. 1, nos. 5 and 6, May and June 1924, pp. 274–280 and 324–328, 1 fig. May: Explains principles of new methods of research, and illustrates difficulties to be encountered in neighborhood of saturation, which have led to abandonment of many of older methods. June: Rational equation for steam up to its critical point; comparison with experimental results for CO_2.

STEAM ACCUMULATORS

Types. High-, Medium- and Low-Pressure Accumulators (Der Gefällespeicher für Hoch-, Mittel-, und Niederdruck), C. Hiesselbach. Wärme, vol. 47, no. 17, Apr. 25, 1924, pp. 175–177, 4 figs. Discusses necessary conditions for economic working, describes Ruths and other types, also new type said to fill requirements.

STEAM ENGINES

Uniflow. Auxiliary Exhaust Valves Versus Additional Clearance in Back-Pressure Unaflow Engines, P. Langer. Power, vol. 59, no. 24, June 10, 1924, pp. 937–939, 6 figs. States that uniflow engine with normal clearance and exhaust valves will give larger output from given amount of steam at greater economy under all conditions of back pressure than uniflow engine with additional clearance space.

The Carmichael Uniflow Steam Engine. Engineering, vol. 117, no. 3051, June 20, 1924, pp. 808–810, 4 figs. Particulars of engine exhibited at British Empire Exhibition, developing 115 b.hp. at 180 r.p.m.; cylinder has a bore of 15 in. and a stroke of 18 in.; works condensing, a jet condenser being fitted beneath it and air pump being operated from crankshaft.

Valve Gears. Positive Piston Slide-Valve Gear, Proell Patent (Zwangläufige Kolbenventilsteuerung Patent Proell), F. Lehmann. Zeit. des Vereines Deutscher Ingenieure, vol. 68, no. 24, June 14, 1924, pp. 625–628, 16 figs. Detailed description; results of steam consumption tests with 1000-hp. steam engine fitted with new gear.

STEAM METERS

Types and Characteristics. Meter Types and Their Characteristics, C. D. Zimmerman. Power Plant Eng., vol. 28, no. 13, July 1, 1924, pp. 696–698. Temperature recorders; instruments for boilers in small boiler plants and power plants; economizer instruments, turbine and miscellaneous instruments; improvements.

STEAM PIPES

Coverings, Heat Loss Through. Heat Loss through Insulating Materials, R. H. Heilman. Power Plant Eng., vol. 28, no. 14, July 15, 1924, pp. 742–745, 1 fig. Method for calculating heat loss through pipe covering used for high steam temperatures. Outlined before A.S.M.E.

Dimensioning. The Correct Dimensioning of Steam Pipes on the Basis of Heat Economy (Die richtige Bemessung von Dampfrohrleitungen auf Grund der besten Wärme-Oekonomie), A. Sachs. Schweizerische Bauzeitung, vol. 83, no. 18, May 3, 1924, pp. 203–205, 2 figs. Numerical and graphical determination of best pipe diameter in which sum of radiation loss and loss due to pressure drop is a minimum.

STEAM POWER PLANTS

Anthracite-Slush-Burning. Pulverized Anthracite Slush Burned at Lykens (Pa.). Power, vol. 60, no. 1, July 1, 1924, pp. 2–7, 9 figs. One of first power plants to utilize anthracite slush in pulverized form, coal mixed with 75 per cent water pumped 2500 ft. under 400 ft. head and dewatered at plant; boiler plant contains six 5000 and six 6000-sq. ft. water-tube boilers; present generating capacity 6400 kw.

Isolated Plant vs. Centralized Power. Slow-speed Steam Engines for Industrial Purposes, D. S. Capper. World Power, vol. 1, no. 6, June 1924, pp. 353–357, 6 figs. Deals with factors which combine to determine best method of power supply, namely, first cost, working cost, suitability to particular work, liability to stoppage, and insurance risk.

STEAM POWER PLANTS

Pine Grove, Pa. Electrical Features of Pine Grove Station, C. D. Gray and M. M. Samuels. Elec. Wld., vol. 84, no. 2, July 12, 1924, pp. 56–62, 13 figs. How electrical features of a large steam plant, built at mouth of a mine, remote from load center, differ from those of large city plant. Power house of East Penn Elec. Co., on Swatara Creek at Pine Grove, Pa., used to illustrate the various electrical features involved.

Reconstruction of. Rebuilding an Old Steam Engine Plant. Power Plant Eng., vol. 28, no. 14, July 15, 1924, pp. 746–748, 7 figs. Description of plant of Stearns Light & Power Co., Ludington, Mich., which is being rebuilt. Owners bought steam under contract, used it to generate electric power and then sold it back to original owners after it had served its purpose.

STEAM TURBINES

Cross-Compound. The Cross-Compound Turbine Adaptable to a Variety of Conditions, E. H. Thompson. Power, vol. 60, no. 2, July 8, 1924, pp. 50–51, 1 fig. Applications of cross-compound principle indicate a growing appreciation of desirable characteristics of this type. Consideration of such units of to-day brings to light a number of ways in which this construction may be utilized and suggests an increasingly important field in future.

High Pressures and Temperatures. Tendencies in Steam Turbine Plant, Eskil Berg. Power Plant Eng., vol. 28, no. 11, June 1, 1924, pp. 592–594, 8 figs. High pressures and temperatures; stage extraction and reheating. Paper read before New York Section of A.S.M.E.

Parsons Line. Is the Parsons Line Straight or Curved? C. F. Merriam. Power, vol. 60, no. 1, July 1, 1924, pp. 8–10, 4 figs. Shows fallacy of assuming that Parsons line is necessarily straight.

Reaction. Largest Straight Reaction Turbine—How Internal Conditions Vary with Load, E. H. Thompson. Power, vol. 59, no. 26, June 24, 1924, pp. 1016–1019, 6 figs. Turbine of Brooklyn Edison Co.'s Hudson Ave. station contains no impulse velocity wheel and is entirely a reaction type; it is served by largest surface condenser so far constructed; conical cylinder bores give improved efficiency.

STEEL

Alloy. See ALLOY STEELS.

Blowholes. An Hypothesis on the Origin of Blowholes in Steel Ingots (Une hypothèse relative à l'origine des ruchages de soufflures dans les lingots d'acier), K.-G. Troubine. Revue de Métallurgie, Jl. 21, no. 5, May 1924, pp. 288–294, 6 figs. Author propounds theory on origin of blowholes. Translated from Russian.

Combined Iron and. Notes on Combined Iron and Steel, H. H. Shephard. Metal Industry (Lond.), vol. 24, no. 24, June 13, 1924, pp. 577–578 and 588, 3 figs. Uses; composition; testing. Author's experience with "combined iron and steel" and "composite steel" is that failures of these materials are due chiefly to faults in manufacture of ingots or billets.

Electric, Testing of. B. D. Enlund Process of Electric Testing of Steel (Elektrische Stahlprüfungs-Verfahren von B. D. Enlund), B. Jkerrman. Zeit. des Vereines Deutscher Ingenieure, vol. 68, no. 24, June 14, 1924, pp. 629–631, 7 figs. Shows that by measuring resistance in test bars, carbon content and total of other ingredients can be determined during decarbonization in simplest way.

High Pressures and Temperatures. Steel for Higher Pressures and Elevated Temperatures, V. T. Malcolm. Power, vol. 59, no. 26, June 24, 1924, pp. 1020–1021, 3 figs. Physical properties resulting from fine, dense structure.

High-Speed. See HIGH-SPEED STEEL.

Manganese. See MANGANESE STEEL.

Mechanical Properties. The Dependence of the Mechanical Properties of Sub-Pearlitic Carbon Steels on Their Carbon Content, Forging Temperature and Heat Treatment (Die Abhängigkeit der mechanischen Eigenschaften unterperlitischer Kohlenstoffstähle von ihrem Kohlenstoffgehalte, der Schmiedetemperatur und der Wärmebehandlung), F. Schmitz. Berichte der Fachausschüsse des Vereins deutscher Eisenhüttenleute, Werkstoffausschuss, report no. 29, 1924, 8 pp., 7 figs. Recrystallization phenomena of austenite, ferrite and pearlite and their influence on notch action; practical application of results obtained.

Silicon. See SILICON STEEL.

Special, Developments in Metallurgy of. Modern Developments in the Metallurgy of Special Steels, W. H. Hatfield. Iron & Coal Trades Rev., vol. 108, no. 2938, June 20, 1924, pp. 1055–1057. Discusses improvement in process of manufacture and manipulation resulting in increased reliability, modified and new compositions resulting in improved or new properties, and more intimate knowledge of properties of steel from designer's viewpoint. From paper read before Iron & Steel Sec., Empire Min. & Met. Congress.

STEEL, HEAT TREATMENT OF

Definitions. Comparison of Heat-Treatment Definitions. Mech. Eng., vol. 46, no. 7, July 1924, p. 435.

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Varying views held by committees of Am. Soc. Steel Treating, Soc. Automotive Engrs., and Am. Soc. Testing Matls.

Hardening, Cyanide Process. Development of a Novel Cyanide Hardening Process, C. Ringstrom. Gas Age-Rec., vol. 53, no. 25, June 21, 1924, pp. 871–873, 3 figs. Describes new and economical process where use of proper fuel has proven necessary for complete success.

Tempering, Oil. Modification of Oil Tempering Bath Makes It a Success, E. Ogur. Fuels & Furnaces, vol. 2, no. 7, July 1924, pp. 647–649, 3 figs. Electric heaters at bottom of bath did not heat oil uniformly. Oil is now pumped through cylinder where it is brought to temperature by electrically heated grids.

Theory and Practice. The Heat Treatment of Steel. Eng. Production, vol. 7, no. 142, July 1924, pp. 205–207, 5 figs. Discusses thermal critical points of steel, annealing, hardening and tempering, alloy steels, and some practical considerations.

STEEL, HIGH-SPEED

Properties and Treatment. High Speed Steel, A. R. Page. Birmingham Met. Soc.—Jl., vol. 8, no. 10, pp. 447–463 and (discussion) 463–468, 14 figs. partly on supp. plate. Composition; theory of high-speed steel; microstructure; heat treatment; testing.

STEEL INDUSTRY

Sheet Steel. Sheet Steel Industry, W. S. Horner. Blast Furnace & Steel Plant, vol. 12, no. 7, July 1924, pp. 319–325. Address of president of Nat. Assn. Sheet and Tin Plate Mfrs. before second annual meeting of sheet steel executives at White Sulphur Springs, W. Va., May 13, 1924.

STEEL WORKS

Electric Power Stations for, Automatic. Automatic Electric Stations for Steel Mills, C. Lichtenberg. Iron & Steel Engr., vol. 1, no. 5, May 1924, pp. 252–256, 6 figs. Review indicating briefly operation of a typical automatic station and application of some of the equipments. Mentions several unique designs which are especially adapted for steel-mill service.

Open-Hearth, Car Upkeep. Reducing Open Hearth Car Upkeep, C. L. Newby. Blast Furnace & Steel Plant, vol. 12, no. 7, July 1924, pp. 331–333, 7 figs. Anti-friction bearings now an important factor in production.

Power Organization. Power Organization in the Steel Industry, B. Bannister and F. M. van Deventer. Mech. Eng., vol. 46, no. 5, May 1924, pp. 248–250. Authors show by comparison that value of fuels used and complexity of problems incident to operation of power system of representative steel works are of greater magnitude than for representative central station; these facts warrant existence of highly qualified organization for steel company in nature of power department; description of such organization and enumeration of benefits which should result.

STOKERS

Electric Drive for. Motors and Control for Stoker Drive, R. Kelly. Elec. Jl., vol. 21, no. 5, May 1924, pp. 221–224, 7 figs. Discusses factors in selection of motors and control equipment.

Underfeed. Solving Clinker Problems with Underfeed Stokers, Jos. G. Worker. Steam Coal Buyer, vol. 1, no. 3, Mar. 1924, pp. 20–26, 4 figs. Shows progress made in securing better combustion and reducing clinkers in burning low-grade high-ash Mid-West coals.

STREET RAILWAYS

Car Maintenance. 217,728 Car-Miles per Pull-In, Robert M. O'Brien. Elec. Ry. Jl., vol. 63, no. 25, June 21, 1924, pp. 969–971, 5 figs. Well-organized system of inspection and repair has enabled New Orleans Public Service, Inc., in 3½ years to eliminate 95 per cent of pull-ins and cut maintenance costs to half.

Cars. Double-Truck Cars Weigh 564 lb. per Seat. Elec. Ry. Jl., vol. 64, no. 2, July 12, 1924, pp. 49–50, 3 figs. Unique arrangement is made for separation of races on new side-entrance cars of Birmingham Elec. Co., Birmingham, Ala.; are of light-weight steel construction and seat 62 passengers.

SUPERHEATED STEAM

Advantages. Convenient Analysis of Modern Plant and Application to Ship Propulsion. Power, vol. 60, no. 1, July 1, 1924, pp. 18–20, 7 figs. Net plant efficiencies with stage bleeding or reheating which may be quickly obtained from simple diagrams with appropriate corrections.

SUPERHEATERS

Detachable-Tube. A New Detachable Tube Superheater. Engineer, vol. 137, no. 3572, June 13, 1924, pp. 667–668, 4 figs. Improved form evolved by Thos. Sugden.

Developments. Superheaters and their Latest Developments, B. N. Broido. Combustion, vol. 11, no. 1, July 1924, pp. 42–45, 4 figs. Developments in design of superheaters to meet demands of modern power plants.

T

TAPS

Manufacture. Taps and Tapping, H. Appleyard. Mech. Wld., vol. 75, no. 1954, June 13, 1924, pp. 366–367, 11 figs. Description of how taps are made.

TERMINALS, LOCOMOTIVE

Turntables. A Remarkable Record in a Turntable Renewal. Ry. Age, vol. 76, no. 37, June 21, 1924, pp. 1759–1761, 5 figs. Southern Pacific bridge crews replace 70-ft. structure with 100-ft. in 1 hr. 46 min.

TERMINALS, RAILWAY

Efficiency. Improvement of Efficiency on Terminals, Chas. Burlingame. St. Louis Ry. Club—Proc., vol. 29, no. 2, June 1924, pp. 31–42. Gives general discussion on topic.

Ferry Terminal. New Ferry Terminal Includes Advanced Designs, F. Jasperson. Ry. Age, vol. 76, no. 25, May 24, 1924, pp. 1249–1252, 8 figs. Reading Co. completes installation at Camden, N. J., to handle heavy seashore traffic. See also Ry. Rev., vol. 74, no. 20, May 17, 1924, pp. 871–876, 11 figs.

TEXTILE MACHINERY

Parts Manufacture. Making Textile Machine Parts, H. R. Simonds. Foundry, vol. 52, no. 14, July 15, 1924, pp. 537–541, 14 figs. Complicated parts are made of gray-iron and malleable castings and offer interesting problems to foundrymen; find application for roll tamp and special stripping machines.

TEXTILES

Mule Yarns. The Effect of Roller Delivery Motion on the Regularity of Mule Yarns, F. Charnley. Textile Inst.—Jl., 15, no. 5, May 1924, pp. T273–T280, 3 figs. Results of investigation; twist, breaking-load and photographic tests.

TIME STUDY

Compiled Form of. Making and Using Time Studies, H. K. Reed. Indus. Mgt. (N. Y.), vol. 68, no. 1, July 1924, pp. 29–34, 5 figs. Deals with compiled form of time study.

Function of. Making and Using Time Studies, H. K. Reed. Indus. Mgt. (N. Y.), vol. 67, nos. 3, 4, 5 and 6, Mar., Apr., May and June, 1924, pp. 145–149, 231–234, 272–278 and 375–382, 12 figs. Mar.; Formulation of policy. Apr. and May: Planning time-study installation. June: Production time-study installation.

TIN PLATE

Machinery for. Tin-Plate Machinery (Ueber Verzinnmaschinen), W. Krämer. Stahl u. Eisen, vol. 44, no. 25, June 19, 1924, pp. 713–715, 4 figs. Discusses Abercarn and Thomas & Davies types of tin-plate machinery and their advantages.

TOLERANCES

Limits. Requirements of a System of Limits, M. E. Steczynski. Sibley Jl. Eng., vol. 38, no. 6, June 1924, pp. 139–146 and 155–156, 5 figs. Fundamental principles involved in logical development of satisfactory system.

TRACTORS

Farm. The General Purpose Farm Tractor, F. A. Wirt. Agricultural Eng., vol. 5, no. 5, May 1924, pp. 102–104, 1 fig. An efficient source of mechanical power that can be used not only for customary tractor drawbar and belt operations, but also, when properly equipped and adjusted, for efficient cultivating and other light drawbar work now more commonly done with horses. Why next big development in tractor industry is expected to be a general-purpose tractor.

TRAFFIC

Congestion Relief. Projects for Relief of Traffic Congestion in New York and Its Environs, E. P. Goodrich and H. M. Lewis. Am. City Mag., vol. 31, no. 1, July 1924, pp. 29–31, 2 figs. Summary of causes of congestion and of important specific suggestions for relief.

TRANSPORTATION

Metropolitan Planning for Future Requirements. Metropolitan Planning for Future Transportation Requirements, J. R. Bibbins. Engrs. & Eng., vol. 41, no. 5, May 1924, pp. 119–135, 22 figs. General survey of growth, trends and conditions; what some cities have done and have not done; the transportation plan.

Street Railways vs. Trolley- and Motor Buses. Operation of Tramways, Trolley Omnibuses and Motor Omnibuses. Surveyor & Mun. & County Engr., vol. 65, no. 1689, May 30, 1924, pp. 509–510. Advantages and disadvantages of the three systems. Report of Lond. County Council Highways Committee.

V

VALVES

Materials, Tests of. Tests on Valve Materials Made Under Working Conditions. Automotive Industries, vol. 51, no. 2, July 10, 1924, pp. 110–112, 1 fig. Results of tests of poppet-type valves for aircraft engines, made of different materials, described in paper presented to Am. Soc. for Testing Matls. at Atlantic City by J. B. Johnson and S. A. Christianson.

VARNISHES

Photomicroscopic Record of Exposures. Photomicroscopic Record of Varnish Exposures, H. A. Gardner. Paint Mfrs.' Assn. of U. S.—Sci. Section, no. 204, June 1924, 11 pp., 17 figs. Presents photomicrographs that illustrate permanent records made from month to month as deterioration proceeds may be made.

VENTILATION

Air-Duct Calculations. Duct Work in Connection with Ventilation, C. W. Kimball. Architectural Forum, vol. 41, no. 1, July 1924, pp. 33–35. Describes duct system and different materials used.

W

WAGES

Minimum-Wage Laws. Minimum Wage Legislation in Canada and its Economic Effects, J. W. MacMillan. Int. Labour Rev., vol. 9, no. 4, Apr. 1924, pp. 507–537. Applies almost exclusively to women and girls and is administered by independent boards or commissions; its main effect on wages has been to reduce inequalities previously existing within single industry; while it has not tended to reduce higher wages; it has had marked effect in reducing hours of work and making them more uniform, and no deleterious effect on employment has been noted; relations between employers and workers have been improved.

WATER-LEVEL INDICATORS

Types. Water Level Indicators (Uber Wasserstandsfernmelder), H. Goetsch. Zeit. für Fernmeldetechnik Werk- u. Gerätebau, vol. 5, no. 3, Mar. 17, 1924, pp. 17–19, 14 figs. Discusses indicators, both full and empty, for water levels of water towers, reservoirs, etc.; continuous level recorders; automatic pump connection and disconnection; addition of telephone to indicator lines.

WATER POWER

Canada. Utilization of Water Power in Canada. Can. Engr., vol. 46, no. 24, June 10, 1924, pp. 601–604, 1 fig. Review of water-power development in relation to coal production, importation and consumption in Canada. Water-power development has relieved situation, particularly in acute fuel area by saving in coal consumption. See also Eng. Wld., vol. 24, no. 5, May 1924, pp. 287–289.

Water Powers of Canada, J. B. Challies. Eng. Jl., vol. 7, no. 7, July 1924, pp. 323–358, 44 figs. partly on supp. plate. Their nature, extent and administration, a national review. Paper read at World Power Conference.

Flathead River. Power Possibilities of the South Fork, Flathead River, B. E. Jones and E. E. Jones. Eng. News-Rec., vol. 93, no. 3, July 17, 1924, pp. 96–98, 4 figs. Large reservoir site makes economic development of power possible. Increased height of Flathead Lake objectionable.

WELDING

Aluminum Castings. Hints for Welding an Aluminum Casting, E. E. Thum. Am. Welding Soc.—Jl., vol. 3, no. 5, May 1924, pp. 26–30, 3 figs. Details of actual practice.

Car and Locomotive Parts. Autogenous and Electric Welding. Ry. Age (Daily Edition), vol. 76, no. 36, June 19, 1924, pp. 1718–1723 and (discussion) 1723–1728, 17 figs. Notes on rolled steel wheels; low-carbon-steel; wrought iron; cast iron; torch cutting; recommendations; regulations for welding. Report of committee presented before Am. Ry. Assn.

Cast Iron. Describes Welding Process, A. H. Jansson. Foundry, vol. 52, no. 11, June 1, 1924, pp. 442–443, 5 figs. Methods used for welding gray or malleable iron castings at comparatively low temperature said to eliminate excessive oxidation of metal; use of welding compound, discovered by M. A. Abele, Berlin, Germany, in form of dark gray powder, possessing oxidizing properties, but also having property of absorbing oxygen.

Electric. See ELECTRIC WELDING.

Manganese Steel. See MANGANESE STEEL.

Pipe. See CAST-IRON PIPE, Welding with Bronze.

WINDING ENGINES

Mines. Electric Winding-Engines, D. Weir. Instn. Min. Engrs.—Trans., vol. 67, Pt. 2, May 1924, pp. 129–143 and (discussion) 143–148, 11 figs. Advantages of electric drive for winders; description of different types of winders; controllers; etc. Winding diagrams.

WIRE ROPE

Manufacture. How Wire Rope Is Manufactured and Used and How Its Life May Be Prolonged in Mine Service, L. W. Bevan. Coal Age, vol. 25, no. 24, June 12, 1924, pp. 872–875, 5 figs. Physical and chemical tests constantly check wire-drawing process; saturated core acts as cushion and lubricant; care of ropes and their application to mine-hoist problems.

WOODWORKING MACHINES

British Empire Exhibition. Wood-Working Machinery. Engineer, vol. 137, no. 3569, May 23, 1924, pp. 560–563, 10 figs. Describes automatic hand-hole boring machine, automatic two-color box printing machine, hand-feed planer, saws and saw benches, etc.

British Show, Olympia. Wood-working Machinery at Olympia, S. Ransome. Engineer, vol. 137, no. 3564, Apr. 18, 1924, p. 412. Brief review of exhibits and exhibitors.

WORKMEN'S COMPENSATION

Length of Service. Compensating Employees for Length of Service. Soc. Indus. Engrs.—Bul., vol. 6, no. 3, Mar. 1924, pp. 6–8. Experience of a number of firms in dealing with the question of what is best method of compensating employees for length of service, especially when they are on piece rates and are engaged in work at which their speed and consequent earning power decreases with age.

Social Insurance and. Workmen's Compensation and Social Insurance. Monthly Labor Rev., vol. 18, no. 4, Apr. 1924, pp. 152–184. Steadying worker's income—establishing unemployment insurance plans; recent workmen's compensation reports; old-age and invalidity pensions of French miners; English unemployment insurance and profit-sharing plan; recommendations of Brit. Imperial Economic Conference respecting workmen's compensation.

Alphabetical List of Advertisers

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THE ENGINEERING INDEX

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(See also page 652 of this issue for supplementary items.)

AIR COMPRESSORS

Lubrication of. Air Compressor Lubrication. So. Engr., vol. 41, no. 5, July 1924, pp. 44–46, 3 figs. Gives factors of correct lubrication, correct oils for common practice, and methods of application.

AIRPLANE ENGINES

Valves, Characteristics of Steels for. Characteristics of Material for Valves Operating at High Temperatures. J. B. Johnson and S. A. Christiansen. Am. Soc. for Testing Matls., Preprint of paper to be presented at meeting June 24–27, 1924, No. 19k, 19 pp., 12 figs. Requirements demanded of steels for service in valves of aircraft engines. Results of laboratory tests and single-cylinder and multiple-cylinder engine tests of steels proposed for valve use.

Scorpion. The A. B. C. "Scorpion." Flight, vol. 16, no. 28, July 10, 1924, pp. 441–443, 6 figs. Gives brief description of its main features and points out that with very small changes, apart from reduction in bore, "Scorpion" was converted from car engine into light-plane power plant; is two-cylinder opposed air-cooled engine with bore of 3.435 in. and stroke of 3.6 in.

AIRPLANES

De Havilland. The De Havilland Type D. H. 51. Flight, vol. 16, no. 28, July 10, 1924, pp. 437–440, 8 figs. Describes two-three-seater biplane of low cost and economical in running; power plant provided with either 90-hp. R. A. F. 1A or 80-hp. Renault, both 8-cylinder air-cooled engines.

Flying Boats. See FLYING BOATS.

Hangars. See HANGARS.

Metal. The Brunet-Descamps A2 Airplane (Lavion Brunet-Descamps A2) l'Aérophile, vol. 32, no. 9–10, May 1–15, 1924, pp. 157–159, 5 figs. A reconnoitering biplane; Lorraine motor of 400 hp.; surface, 44 sq. m., total weight 1900 kg.; highest speed, 240 km. per hr.; constructed by Descamps.

Monoplanes. Monoplane Theory, N. K. Bose. Lond., Edinburgh & Dublin Philosophical Mag. & Jl. of Sci., vol. 48, no. 283, July 1924, pp. 113–125, 1 fig. Discusses theory of circulation of liquid around airplane equal and opposite to that of vortex formed, and reduces it to mathematical basis.

Nieuport-Delage Type 42. The Nieuport-Delage Type 42. Flight, vol. 16, no. 30, July 24, 1924, pp. 461–462, 4 figs. Hispano-Suiza engine of twelve-cylinder V-type with bore of 140 mm. and stroke of 150 mm.; power developed, 600 hp. at 2000 r.p.m.

Pressure Distribution on Wings. Pressure Distribution Over the Wings of an MB-3 Airplane in Flight, F. H. Norton. Nat. Advisory Committee for Aeronautics, report no. 193, 1924, 17 pp., 15 figs. Investigation carried out to determine distribution of load over wings of high-speed airplane under all conditions of flight and pressure distribution, during level flight, over portions of wings in slipstream and, during violent maneuvers, over entire wing surface; results obtained.

Pursuit. The Curtiss PW8 Pursuit Plant Described. Aviation, vol. 17, no. 2, July 14, 1924, pp. 746–748, 5 figs. Type in which R. L. Maughan flew from New York to San Francisco between dawn and dusk.

Seaplanes. See SEAPLANES.

Slipstream Velocity. Investigation of Slipstream Velocity, J. W. Crowley, Jr. Nat. Advisory Committee for Aeronautics, report no. 194, 1924, 7 pp., 9 figs. Results of experiments to investigate velocity of air in slipstream in horizontal and climbing flight to determine form of expression giving slipstream in terms of air speed of airplane.

Wings. Elements of the Wing Section Theory and of the Wing Theory, M. M. Munk. Nat. Advisory Committee for Aeronautics, report no. 191, 1924, 25 pp., 4 figs. Results of theory of wings and of wing sections which are of immediate practical value; results proven and demonstrated by use of simple conceptions of "kinetic energy" and "momentum."

Wood Members, Stresses in. Stresses in Wood Members Subjected to Combined Column and Beam Action, J. A. Newlin and G. W. Trayer. Nat. Advisory Committee for Aeronautics, report no. 188, 1924, 13 pp., 9 figs. Results of tests to determine properties of wing beams of standard and proposed sections, conducted by Forest Products Laboratory and financed by Army and Navy.

AIRSHIPS

Navigation. The Airship's Position (Le Point en Aéronef), L. Garin. Arts et Métiers, vol. 77, no. 44, May 1924, pp. 161–170, 5 figs. Discusses navigation charts, gives a number of curves, and develops formulas for determining position.

Rigid. The Strength of Rigid Airships, C. P. Burgess, J. C. Hunsaker and S. Truscott. Roy. Aeronautical Soc.—Jl., vol. 28, no. 162, June 1924, pp. 327–448, 26 figs. Presents present state of our knowledge with regard to general strength of rigid airships. Strength of girders, static forces affecting longitudinal strength, aerodynamic forces, longitudinal strength, secondary stresses resulting from primary shearing forces, effect of gas pressure, effect of tension in outer cover, transverse strength, and factors of safety and comparative strength. Bibliography.

ALLOYS

Aluminum. See ALUMINUM ALLOYS.

Brass. See BRASS.

Corroded, Coatings Formed on. Coatings Formed on Corroded Metals and Alloys, G. M. Enos and R. J. Anderson. Am. Inst. Min. & Met. Engrs.—Trans., Advance paper No. 1358-N, July 1924, 9 pp., 16 figs. As coating formed affects corrosion rate, duplicate samples of eight non-ferrous alloys were placed in flowing mine water. Alloys tested were as cast or as rolled, and machined or polished. Describes tests and gives corrosion losses and appearance of samples at end of test.

Corrosion-Resistant. Corrosion-Resistant Alloys—Past, Present and Future—With Suggestions as to Future Trend, P. A. E. Armstrong. Am. Soc. for Testing Matls., Preprint of Paper presented at meeting June 24–27, 1924, No. 19b, 15 pp.

Symposium on Corrosion-Resistant, Heat-Resistant and Electrical-Resistance Alloys. Am. Soc. for Testing Matls., Preprint of paper presented at meeting June 24–27, 1924, No. 19a, 4 pp. Contains tabulation on supplementary pages of manufacturers' data on composition and properties of the alloys.

Fusible. Properties of Fusible Alloys, N. F. Budgen. Chem. & Industry, vol. 43, no. 27, July 4, 1924, pp. 200T-203T, 2 figs. Discusses properties of lead, bismuth, tin, cadmium, and mercury, used for fusible plugs in automatic fire-extinguisher systems, also manufacture of small statuary, etc.

Iron. See IRON ALLOYS.

Light. Light Metals in Alloys (Die Leichtmetale in Legierungen), F. Regelsberger. Zeit. für angewandte Chemie, vol. 37, no. 17, Apr. 24, 1924, pp. 235–239. Discusses alloys of light with other metals and how properties of both classes are affected by alloying, especially alkali metals, magnesium, beryllium, aluminum, etc.

ALUMINUM

Welding. Gas Welding of Aluminum, S. W. Miller. Can. Machy., vol. 32, no. 6, Aug. 7, 1924, pp. 33–34 and 50. Discusses porosity in weld, character of flame, preheating casting, manipulation of welding rod, and welding sheet aluminum. Abstract of paper read before N. Y. sec. Am. Welding Soc.

ALUMINUM ALLOYS

Aluminum-Copper-Magnesium, Casting and Heat Treatment. Casting and Heat Treatment of Some Aluminum-Copper-Magnesium Alloys, S. Daniels and J. B. Johnson. Am. Inst. Min. & Met. Engrs.—Trans., Advance paper No. 1350-N, July 1924, 22 pp., 6 figs. Deals with portion of work of Material Section, Engineering Division, Air Service, U. S. A., on casting and extended heat treatment of alloys of duralumin type (copper 2.5–5.0 per cent, magnesium 0.0–1.0 per cent, silicon 0.2–1.0 per cent, iron 0.3–1.5 per cent, manganese 0.0 to 1.0 per cent, chromium, etc.). This range of compositions includes an alloy recently placed on market in cast form and designated as Lynite 195.

Properties. Light Alloys of Aluminium, W. Rosenhain and S. L. Archbutt. Metal Industry (Lond.), vol. 25, nos. 1 and 2, July 4 and 11, 1924, pp. 3–7, and 27–30 and 44, 14 figs. Specific tenacity; age hardening; casting alloys and wrought alloys in general use; properties of chief alloys; heat treatment; application. Paper read before Empire Min. & Met. Congress.

AUTOMOBILE ENGINES

Fuel Heat-Loss Elimination. How to Get the Most Out of the Gasoline You Pay for, G. W. Jones and A. A. Straub. Automotive Industries, vol. 51, no. 4, July 24, 1924, pp. 212–213, 1 fig. Average motor vehicle wastes 30 per cent of heat value of fuel used. Changing from low- to higher-grade fuel and use of air preheater requires readjustment of carburetor.

Heavy-Oil. Heavy-Oil Engines for Vehicles with Special Reference to Economy (Schweröl-Motoren für Fahrzeuge unter besonderer Berücksichtigung ihrer Wirtschaftlichkeit), F. E. Bielefeld. Wirtschaftsmotor, vol. 6, no. 5, May 25, 1924, pp. 3–15, 34 figs. Discusses low-pressure carburetors, hot-bulb engines, Diesel engines, atomizing and injection of fuel; compares various types of engines, their advantages and disadvantages.

White-Wall. The White-Wall Engine. Autocar, vol. 53, no. 1500, July 18, 1924, p. 116, 2 figs. Interesting air-cooled, four-cylinder two-cycle motor, with special features of scavenging, fuel charging, and exhaust extraction.

AUTOMOBILE FUELS

Consumption and Dilution. Consumption and Dilution of Automobile Engine Oils. Lubrication, vol. 10, no. 6, June 1924, pp. 66–72, 13 figs. Description of dynamometer apparatus and test routine; discusses dilution, lubricating system, oil viscosity requirements, value of road tests, and oil consumption.

Producer Gas. Producer Gas for Road Transport. Motor Transport (Lond.), vol. 38, no. 1002, May 12,

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NOTE.—The abbreviations used in indexing are as follows:

Academy (Acad.)
American (Am.)
Associated (Assoc.)
Association (Assn.)
Bulletin (Bul.)
Bureau (Bur.)
Canadian (Can.)
Chemical or Chemistry (Chem.)
Electrical or Electric (Elec.)
Electrician (Elecn.)
Engineer[s] (Engr.[s])
Engineering (Eng.)
Gazette (Gaz.)
General (Gen.)
Geological (Geol.)
Heating (Heat.)
Industrial (Indus.)
Institute (Inst.)
Institution (Instn.)
International (Int.)
Journal (Jl.)
London (Lond.)
Machinery (Machy.)
Machinist (Mach.)
Magazine (Mag.)
Marine (Mar.)
Materials (Matls.)
Mechanical (Mech.)
Metallurgical (Met.)
Mining (Min.)
Municipal (Mun.)
National (Nat.)
New England (N. E.)
Proceedings (Proc.)
Record (Rec.)
Refrigerating (Refrig.)
Review (Rev.)
Railway (Ry.)
Scientific or Science (Sci.)
Society (Soc.)
State names (Ill., Minn., etc.)
Supplement (Supp.)
Transactions (Trans.)
United States (U. S.)
Ventilating (Vent.)
Western (West.)

Classified List of Mechanical Equipment

Manufactured by Firms Represented in MECHANICAL ENGINEERING

FOR ALPHABETICAL LIST OF ADVERTISERS, SEE PAGE 156

Accumulators, Hydraulic
Farrel Foundry & Machine Co.
Mackintosh-Hemphill Co.
* Worthington Pump & Mchry. Corp'n

Aftercoolers, Air
* Ingersoll-Rand Co.

Agitators
Hill Clutch Machine & Fdry. Co.

Air Compressors, Receivers, etc.
(See Compressors, Receivers, etc., Air)

Air Conditioning Apparatus
* American Blower Co.
* Carrier Engineering Corp'n
* Clarage Fan Co.
* Sturtevant, B. F. Co.

Air-Jet Lifts
* Schutte & Koerting Co.

Air Washers
* American Blower Co.
* Carrier Engineering Corp'n
* Clarage Fan Co.
* Cooling Tower Co. (Inc.)
* Sturtevant, B. F. Co.

Alloys
Driver-Harris Co.

Ammeters
* Bristol Co.
* General Electric Co.
* Westinghouse Electric & Mfg. Co.

Anemometers
Weber, F. Co. (Inc.)

Annealing
* American Metal Treatment Co.
Nuttall, R. D. Co.

Arc Welding Equipment
* Westinghouse Elec. & Mfg. Co.

Arches, Boiler Furnace
* McLeod & Henry Co.
* Titusville Iron Works Co.

Arches, Fire Door
* McLeod & Henry Co.

Arches, Ignition (Flat Suspended)
* Combustion Engineering Corp'n
* McLeod & Henry Co.

Asbestos Products
Carey, Philip Co.
Garlock Packing Co.
Johns-Manville (Inc.)

Ash Lifts, Telescopic
Palmer-Bee Co.

Autoclaves
Farrel Foundry & Machine Co.

Babbitt Metal
* Medart Co.
* Westinghouse Elect. & Mfg. Co.

Ball Bearings, Gages, etc.
(See Bearings, Gages, Ball)

Balls, Brass and Bronze
* Atlas Ball Co.
* Gwilliam Co.

Balls, Steel
* Atlas Ball Co.
* Gwilliam Co.
* New Departure Mfg. Co.
* S K F Industries (Inc.)

Barometers
* American Schaeffer & Budenberg Corp'n

Barometers, Mercurial
* Tagliabue, C. J. Mfg. Co.

Bearings, Ball
Fafnir Bearing Co.
* Gwilliam Co.
Marlin-Rockwell Corp'n
* New Departure Mfg. Co.
* Norma-Hoffmann Bearings Corp'n
* S K F Industries (Inc.)
* Strom Ball Bearing Mfg. Co.

Bearings, Collar Oiling
Hill Clutch Machine & Foundry Co.

Bearings, Dadial Thrust
* New Departure Mfg. Co.

Bearings, Roller
* Gwilliam Co.
* Hyatt Roller Bearing Co.
* Norma-Hoffmann Bearings Corp'n
* Royersford Fdry. & Mach. Co.
* Timken Roller Bearing Co.

Bearings, Self-Oiling
* Brown, A. & F. Co.
* Doehler Die-Casting Co.
* Falls Clutch & Machinery Co.
Hill Clutch Machine & Fdry. Co.
* Jones, W. A. Fdry. & Mach. Co.
Link-Belt Co.
* Royersford Fdry. & Mach. Co.
* Wood's, T. B. Sons Co.

Bearings, Tapered
* Timken Roller Bearing Co.

Bearings, Thrust
Fafnir Bearing Co.
* General Electric Co.
* Gwilliam Co.
Hill Clutch Machine & Fdry. Co.
* Norma-Hoffmann Bearings Corp'n
* S K F Industries (Inc.)
* Strom Ball Bearing Mfg. Co.
* Timken Roller Bearing Co.

Belt Dressing
* Dixon, Joseph Crucible Co.
Gandy Belting Co.

Belt Lacing, Steel
* Bristol Co.

Belt Tighteners
* Brown, A & F. Co.
Hill Clutch Machine & Fdry. Co.
* Jones, W. A. Fdry. & Mach. Co.
Link-Belt Co.
* Medart Co.
* Smidth, F. L. & Co.
* Wood's, T. B. Sons Co.

Belt Tighteners, Automatic
Hill Clutch Machine & Foundry Co.

Belting, Canvas (Stitched)
Gandy Belting Co.
* U. S. Rubber Company

Belting, Conveyor
Gandy Belting Co.
* Goodrich, B. F. Rubber Co.
* United States Rubber Co.

Belting, Elevator
Gandy Belting Co.
* Goodrich, B. F. Rubber Co.
* United States Rubber Co.

Belting, Endless
Gandy Belting Co.

Belting, Fabric
Gandy Belting Co.

Belting, Rubber
* Goodrich, B. F. Rubber Co.
* United States Rubber Co.

Belting, Waterproof
Gandy Belting Co.

Bending & Straightening Machines
* Long & Allstatter Co.

Bends, Pipe
* Frick Co. (Inc.)
* Vogt, Henry Machine Co.

Billets, Steel
* Timken Roller Bearing Co.

Blocks, Tackle
Clyde Iron Work Sales Co.
* Roebling's, John A. Sons Co.

Blowers, Centrifgual
* American Blower Co.
* Clarage Fan Co.
* Coppus Engineering Corp'n
* De Laval Steam Turbine Co.
* General Electric Co.
* Ingersoll-Rand Co.
* Kerr Turbine Co.
* Sturtevant, B. F. Co.
* Westinghouse Electric & Mfg. Co.

Blowers, Fan
* American Blower Co.
* Clarage Fan Co.
* Coppus Engineering Corp'n
* Green Fuel Economizer Co.
* Sturtevant, B. F. Co.

Blowers, Forge
* American Blower Co.
* Sturtevant, B. F. Co.

Blowers, Pressure
* American Blower Co.
* Clarage Fan Co.
Lammert & Mann Co.
* Sturtevant, B. F. Co.

Blowers, Rotary
Lammert & Mann Co.
* Schutte & Koerting Co.
* Sturtevant, B. F. Co.

Blowers, Soot
Diamond Power Specialty Corp'n
* Sturtevant, B. F. Co.

Blowers, Steam Jet
* Schutte & Koerting Co.

Blowers, Turbine
* Coppus Engineering Corp'n
* Sturtevant, B. F. Co.

Blueing (Metal)
* American Metal Treatment Co.

Boards, Drawing
Dietzgen, Eugene Co.
Keuffel & Esser Co.
New York Blue Print Paper Co.
ParVell Laboratories
U. S. Blue Co.
Weber, F. Co. (Inc.)

Boiler Baffles
* King Refractories Co. (Inc.)
* McLeod & Henry Co.

Boiler Compounds
* Dixon, Joseph Crucible Co.
Unisol Mfg. Co.

Boiler Coverings, Furnaces, Tube Cleaners, etc.
(See Coverings, Furnaces, Tube Cleaners, etc., Boiler)

Boiler Fronts
* O'Brien, John Boiler Works Co.
* Titusville Iron Works Co.

Boiler Settings, Steel Cased
* Casey-Hedges Co.
* McLeod & Henry Co.
* O'Brien, John Boiler Works Co.
* Vogt, Henry Machine Co.
* Walsh & Weidner Boiler Co.

Boilers, Heating
* Casey-Hedges Co.
* Erie City Iron Works
* Keeler, E. Co.
* Leffel, James & Co.
Lidgerwood Mfg. Co.
* O'Brien, John Boiler Works Co.
* Titusville Iron Works Co.
* Union Iron Works
* Walsh & Weidner Boiler Co.

Boilers, Locomotive
* Casey-Hedges Co.
* Keeler, E. Co.
* Leffel, James & Co.
* Titusville Iron Works Co.
* Union Iron Works
* Walsh & Weidner Boiler Co.

Boilers, Marine (Scotch)
Bethlehem Shipbldg.Corp'n(Ltd.)
* Casey-Hedges Co.
* Leffel, James & Co.
* Titusville Iron Works Co.
* Walsh & Weidner Boiler Co.

Boilers, Marine (Water Tube)
* Babcock & Wilcox Co.
Bethlehem Shipbldg.Corp'n(Ltd.)
* Casey-Hedges Co.
* Connelly, D. Boiler Co.
* O'Brien, John Boiler Works Co.
* Springfield Boiler Co.
* Titusville Iron Works Co.
* Walsh & Weidner Boiler Co.

Boilers, Portable
* Casey-Hedges Co.
* Erie City Iron Works
* Frick Co. (Inc.)
* Keeler, E. Co.
* Leffel, James & Co.
Lidgerwood Mfg. Co.
* O'Brien, John Boiler Works Co.
* Titusville Iron Works Co.
* Union Iron Works
* Walsh & Weidner Boiler Co.

Boilers, Tubular (Horizontal Return)
* Bigelow Co.
* Casey-Hedges Co.
* Cole, R. D. Mfg. Co.
* Connelly, D. Boiler Co.
* Erie City Iron Works
* Keeler, E. Co.
* Leffel, James & Co.

Boilers, Tubular (Horizontal Return)
Lidgerwood Mfg. Co.
Morrison Boiler Co.
* O'Brien, John Boiler Works Co.
* Titusville Iron Works Co.
* Union Iron Works
* Vogt, Henry Machine Co.
* Walsh & Weidner Boiler Co.
* Webster, Howard J.
* Wickes Boiler Co.

Boilers, Tubular (Vertical Fire)
* Bigelow Co.
* Casey-Hedges Co.
Clyde Iron Works Sales Co.
* Keeler, E. Co.
* Leffel, James & Co.
Lidgerwood Mfg. Co.
Morrison Boiler Co.
* O'Brien, John Boiler Works Co.
* Titusville Iron Works Co.
* Union Iron Works
* Walsh & Weidner Boiler Co.

Boilers, Water Tube (Horizontal)
* Babcock & Wilcox Co.
Bethlehem Shipbldg.Corp'n(Ltd.)
* Casey-Hedges Co.
* Cole, R. D. Mfg. Co.
* Connelly, D. Boiler Co.
* Edge Moor Iron Co.
* Erie City Iron Works
* Keeler, E. Co.
* Ladd, George T. Co.
Morrison Boiler Co.
* O'Brien, John Boiler Works Co.
* Springfield Boiler Co.
* Union Iron Works
* Vogt, Henry Machine Co.
* Walsh & Weidner Boiler Co.
* Wickes Boiler Co.

Boilers, Water Tube (Inclined)
* Babcock & Wilcox Co.
Bethlehem Shipbldg.Corp'n(Ltd.)
* Bigelow Co.
* Casey-Hedges Co.
* Keeler, E. Co.
* Ladd, George T. Co.
Morrison Boiler Co.
* O'Brien, John Boiler Works Co.
* Vogt, Henry Machine Co.
* Walsh & Weidner Boiler Co.

Boilers, Water Tube (Vertical)
* Babcock & Wilcox Co.
* Bigelow Co.
* Casey-Hedges Co.
* Erie City Iron Works
* Keeler, E. Co.
* Ladd, George T. Co.
Morrison Boiler Co.
* O'Brien, John Boiler Works Co
* Walsh & Weidner Boiler Co.
* Wickes Boiler Co.

Boring and Drilling Machines
Universal Boring Machine Co.

Boring, Drilling and Milling Machines (Horizontally Combined)
Universal Boring Machine Co.

Boxes, Carbonizing
Driver-Harris Co.

Boxes, Case Hardening
Driver-Harris Co.

Brake Blocks
Johns-Manville (Inc.)

Brakes, Air
* Allis-Chalmers Mfg. Co.
* General Electric Co.

Brass Goods
* Scovill Mfg. Co.

Brass Mill Machinery
Farrel Foundry & Machine Co.

Breechings, Smoke
Morrison Boiler Co.
* Titusville Iron Works Co.
* Vogt, Henry Machine Co.

Brick, Fire
* Bernitz Furnace Appliance Co.
* Celite Products Co.
* Drake Non-Clinkering Furnace Block Co.
Keystone Refractories Co.
* King Refractories Co. (Inc.)
* McLeod & Henry Co.
Maphite Co. of Amer.

*Catalogue data of firms marked * appear in the A.S.M.E. Condensed Catalogues of Mechanical Equipment, 1923-24 Volume*

1924, p. 580, 1 fig. Details of gas-producer plant; question of cost; results of recent French trials with charcoal as fuel.

AUTOMOBILE MANUFACTURING PLANTS

England. Intensive Production. Automobile Engr., vol. 14, no. 191, July 1924, pp. 203–210, 21 figs. Describes modern works located at Aylesbury, Bucks, planned and equipped for large outputs.

Materials Handling in. Lumber Handling in an Automobile-Body Plant, B. Nagelvoort and T. D. Perry. Mech. Eng., vol. 46, no. 8, Aug. 1924, pp. 472–477 (includes discussion), 11 figs. Yard layouts for efficient and economical handling, storing, drying, and cutting of lumber: Steam consumption of dry kilns. Equipment for handling lumber, including dry-kiln trucks and transfer cars, power transfer cars, lumber ifts, stackers, etc.

Wide Use of Material Handling Equipment in Auto Plants. Automotive Mfr., vol. 65, nos. 10, 11, 12, and vol. 66, nos. 1, 2, Jan., Feb., Mar., Apr., May 1924, pp. 21–23 and 30, 11–13, 5–9, 19–20, 6–8, 21 figs. The various kinds of conveyors used and the widely differing work which they are doing successfully and at a saving. Symposium presenting advantages of all forms.

AUTOMOBILES

A. C. Racing. Maximum Power for Minimum Weight. Autocar, vol. 53, no. 1499, July 11, 1924, pp. 63–64, 3 figs. New A. C. racing car with "crab" track, which has been specially built for rapid acceleration.

Bean. The 14 H. P. Bean Chassis. Automobile Engr., vol. 14, no. 191, July 1924, pp. 188–195, 16 figs. on supp. plate. 14-hp. chassis manufactured by A. Harper, Sons & Bean, Ltd., of Dudley and Tipton has four-cylinder engine built in one unit with four-speed gear box; 75 mm. bore by 135 mm. stroke.

Bugatti. The Four-Cylindered Bugatti. Auto-Motor Jl., vol. 29, no. 28, July 10, 1924, pp. 581–583, 11 figs. 11.5-hp. monobloc, four-cylinder engine, 1452 and 1496 cc.; road speed, 60 m.p.h.; touring, 20 to 25 m.p.h.; 1 gal. gasoline required for 40 miles.

Chassis Dimensions. Table of Chassis Dimensions for Body Building. Motor Transport (Phila.), vol. 30, no. 8, July 10, 1924, pp. 303–310. Table giving dimensions of different models of various makes.

Daimler. His Majesty's New Cars. Autocar, vol. 53, no. 1500, July 18, 1924, pp. 105–107, 9 figs. Details of 57-hp. 6-cylinder special Daimler model, of which four have been built to order of King George.

Duesenberg. Duesenberg Race Car Resembles Stock Product in Many Particulars, B. M. Ikert. Automotive Industries, vol. 51, no. 3, July 17, 1924, pp. 156–160, 7 figs. Car much smaller and lighter and has entirely different frame construction, but engine, clutch, gear set, and axles are very similar in design. Supercharger not needed in larger machine.

Fiat. Fiat Automobile Production Methods, J. A. Lucas and F. E. Bardrof. Am. Machinist, vol. 61, no. 6, Aug. 7, 1924, pp. 223–225, 10 figs. Methods used in machining top section of crankcase; all crankcase parts are aluminum castings; various milling, drilling and reaming operations.

Frazer Nash. The New Frazer Nash. Autocar, vol. 53, no. 1500, July 18, 1924, pp. 121–122, 4 figs. Light car of 1500 cc., four-cylinder with 3-bearing crank and overhead valves, vertical dynamo and starting motor, built by Frazer Nash, Ltd.

German. German Small Auto Industry (Die deutsche Kleinauto-Industrie. Allgemeine Automobil-Zeitung, vol. 25, no. 23, June 7, 1924, pp. 24–27, 10 figs. Details of design and construction of number of small motor-car types, including Helios, Dixie, Faum, Adler, and Baer.

Nash. Nash Adds Smaller Six and Drops Four Cylinder Models, D. Blanchard. Automotive Industries, vol. 51, no. 5, July 31, 1924, pp. 231–236, 10 figs. Four-wheel brakes and balloon tires on disk wheels, steering gear redesigned with larger ratio.

Pierce-Arrow. Pierce Arrow Announces Lighter Six with L-Head Engine, D. Blanchard. Automotive Industries, vol. 51, no. 5, July 31, 1924, pp. 237–240, 4 figs. Piston displacement and weight are 30 per cent less than that of larger model which is continued. Four-wheel brakes, balloon tires, and torque bar are features.

Rover. The Rover Eight. Auto-Motor Jl., vol. 29, no. 29, July 17, 1924, pp. 599–601, 9 figs. Latest model of light car, horizontal opposed cylinder, twin engine, 1300 cc.; gearing; three forward and one reverse made by Rover Co., Ltd., Coventry.

Shafts, Stiffness of. Calculating the Stiffness of Shafts, F. A. W. Livermore. Automobile Engr., vol. 14, no. 191, July 1924, p. 197. Gives simplified formula.

Talbot. The 16–50 H. P. Six-Cylindered Talbot. Auto-Motor Jl., vol. 29, no. 30, July 24, 1924, pp. 619–621, 10 figs. New monobloc design with detachable head and overhead valves; cylinders have bore of 70 mm. and piston stroke of 110 mm.

Tires. See TIRES, RUBBER.

Varnishes. See VARNISHES, Automobile.

Wembley Exposition. At the British Empire Exhibition. Motor Transport (Lond.), vol. 38, no. 1002, May 12, 1924, pp. 581–585, 9 figs. Reviews features of transport vehicle exhibits and gives details of tires, accessories, and component parts.

Windshield Design. Many Faults Are Found in Present Day Windshield Design, K. Feilcke. Automotive Industries, vol. 51, no. 4, July 24, 1924, pp. 202–205, 17 figs. Convenient and quickly operated adjusting device is one most important need today. Location and angular position of panels must be correct to insure clear vision.

B

BALANCING MACHINES

Odén-Keen. An Automatic and Continuous Recording Balance (The Odén-Keen Balance), J. R. H. Coutts, E. M. Crowther, B. A. Keen and S. Odén. Roy. Soc.—Proc., vol. 106, no. A735, July 1, 1924, pp. 33–51, 11 figs. Describes improved form of automatic self-recording balance in which control is effected electromagnetically with no loss of sensitivity up to maximum load balance is designed to carry.

BEARINGS, BALL

Stainless-Steel. Carrying Capacity of Ball Bearings Made of Stainless Steel, A. Hultgren. Am. Soc. for Testing Matls., Preprint of paper presented at meeting June 24–27, 1924, No. 19g, 7 pp. Brief summary of series of tests of stainless steel as a ball-bearing material conducted during past six years in Gothenburg Laboratory of Aktiebolaget Svenska Kullagerfabriken; stainless steels from an American, a British and a Swedish source were used.

BEARINGS, ROLLER

Taper. Taper Roller Bearings. Automobile Engr., vol. 14, no. 191, July 1924, pp. 196–197, 10 figs. New type with rollers guided from race.

BLAST FURNACES

Electric. Gas Economics in Operation of Electric Blast Furnaces (Betrachtungen über die Gaswirtschaft im Elektrohochofenbetriebe), R. Durrer. Stahl u. Eisen, vol. 44, no. 26, June 26, 1924, pp. 748–750. Calculation of gas conditions in electric blast furnace; proposes to conduct operations in such way that whole of gas is used in electric blast furnace itself.

BOILER FEEDWATER

Treatment. Feed Water Treatment. Eng. & Boiler House Rev., vols. 37, and 38, nos. 8, 9 and 1, Mar., Apr. and July 1924, pp. 281–282, 323–324, 5–7, 1 fig. Notes on recent papers read before Instn. Mech. Engrs. Boiler feedwater and scaling; present-day practice with lime-soda process; zeolite process.

The Prevention of Scale Formation by Boiler Water Conditioning, R. E. Hall, C. Fischer and G. W. Smith. Iron & Steel Engr., vol. 1, no. 6, June 1924, pp. 312–327, 18 figs. Discusses conditioning of boiler water based on sulphate concentration and pressure of boiler water, removal of precipitated sludge and suspended insoluble matter, prevention of droplets (moisture) entrained in steam.

BOILER FIRING

Pulverized Fuel. Pulverized Fuel for Boilers, W. M. Selvey. Colliery Guardian, vol. 128, no. 3316, July 18, 1924, pp. 157–158. Discusses fuel preparation, burners, absorption of heat, and application to British conditions. Abstract of paper read before World Power Conference.

BOILER FURNACES

Air Preheaters. Experiments on a Cylindrical Steam Boiler with and without Preheated Air, W. H. Owen. Inst. Mar. Engrs.—Trans., vol. 36, June 1924, pp. 1–37, 12 figs. Discusses preheating air of combustion; describes new form of preheater extracting 65 to 70 per cent of heat in waste gases, and tests made.

The Ljungström Air Preheater, B. G. Brolinson. Iron & Steel Engr., vol. 1, no. 6, June 1924, pp. 351–358 and (discussion) 358–360, 22 figs. Discusses application of this preheater based on principle of carrying heat continually in mechanical way from flue gases to incoming air, apparatus being self-contained, compact in design, simple in operation and permitting of ready application. Paper read before Assn. Iron & Steel Elec. Engrs., Fuel Saving Conference.

The Preheating of Combustion Air, J. B. Bullock. So. African Inst. Elec. Engrs.—Trans., vol. 15, part 5, May 1924, pp. 388–396, 4 figs. Describes latest system of recovering and putting to beneficial use maximum amount of heat available in coal as fired to boiler or furnace, and gives some account of results obtainable with system and of their bearing on present boiler practice.

BOILER ROOMS

Control. Measurement of Input and Output in Boiler Rooms, J. M. Spitzglass. Iron & Steel Engr., vol. 1, no. 6, June 1924, pp. 299–309 and (discussion) 309–311, 11 figs. Shows how material quantities can be measured accurately and conveniently in steel-plant boiler rooms, including practical application of measuring flow of fluids and of coal; determination of constants.

BOILERS

Baffles. Designing Boiler Baffles, A. W. Patterson, Jr. Combustion, vol. 11, no. 2, Aug. 1924, pp. 122–124, 7 figs. Some problems brought about by incorrect baffle design, and methods by which conditions in particular plants were remedied.

Corrosion. Corrosion in Steam Boiler Plant, G. E. Swett. Pac. Mar. Rev., vol. 21, no. 7, July 1924, p. 383, 1 fig. Describes apparatus known as Hickman air separator, an automatic method of eliminating chief cause of depreciation in steam-generating equipment.

Electrically Heated. Electric Boilers (Les chaudières électriques), P. Bergeon. Revue Universelle des Mines, vol. 67, no. 4, Feb. 15, 1924, pp. 241–248. Discusses resistance boilers, induction boilers, and electrode boilers; comparison of cost of steam in electric and other boilers; application of electric boilers.

Field, Inefficient Handling of. Inefficient Handling of Field Boilers Source of Waste and Expense, F. G. D. Muller. Nat. Petroleum News, vol. 16, no. 29, July 16, 1924, pp. 77–79, 4 figs. Discusses improving efficiency of boilers, preheating feedwater, driller's gear attuned to exhaust, water filter for field boilers, and uses for old boilers.

Locomotives. See LOCOMOTIVE BOILERS.

Seams, Brittleness and Cracks in. Brittleness and Cracks in Seams of Steam Boilers, H. Kriegsheim. Power Plant Eng., vol. 28, no. 15, Aug. 1, 1924, pp. 792–795, 6 figs. Causes and prevention of so-called caustic embrittlement.

Standardization. Sixteen Years of Boiler Standardization, J. A. Stevens. Power, vol. 60, no. 6, Aug. 5, 1924, pp. 217–218. Details of work of Boiler Code Committee.

Vertical. Temperature Distribution and Water Circulation in Möller Vertical-Tube Boilers (Temperaturverteilung und Wasserumlauf beim Möller-Steilrohrkessel), O. Berner. Wärme, vol 47, no. 10, Mar. 7, 1924, pp. 93–97, 6 figs. Discusses temperature distribution in starting and in operating, water circulation in state of inertia. Effect of feeding and suddenly increased drawing off of steam on water circulation.

Waste-Heat. Utilizing Waste Heat. K. W. Heinrich. Pac. Mar. Rev., vol. 21, no. 7, July 1924, pp. 376–377, 3 figs. Describes fire-tube steam or hot-water generator especially adapted for reclaiming heat from exhaust gases of Diesel engines, developed . Davis Eng. Corp. Possibilities of application.

Waste-Heat Boilers and Vertical Retort Instal ons Gas Jl., vol. 167, no. 3190, July 2, 1924, pp. 10 22, 20 figs. Twelfth report of Research Sub-Comm ee of Gas Investigation Committee. Investigation co ducted on water-tube waste-heat boilers attached to installations of Woodall-Duckham continuous vertical retorts at Windsor Street works of Birmingham Gas Dept. See also Gas Wld., vol. 80, no. 2084, June 28, 1924, pp. 633–647, 5 figs.

BONUS SYSTEMS

Maintenance of. Maintenance of a Standard Time and Bonus System, C. W. Setter. Soc. Indus. Engrs.—Bul., vol. 6, no. 7–8, July-Aug. 1924, pp. 10–14. Details as practiced at works of Republic Metalware Co., Buffalo, N. Y.

BRAKES

Passenger-Train. Passenger Train Handling. Ry. & Locomotive Eng., vol. 37, no. 7, July 1924, pp. 219–222, 4 figs. Discusses brake effect from brake pipe reduction, graduated release and mountain grade braking. Paper presented at Air Brake Assn. Convention.

Power. The Commission's Report on Power Brakes. Ry. Rev., vol. 75, no. 7, Aug. 16, 1924, pp. 251–257. Mandatory conclusions enunciated by Interstate Commerce Commission as result of its extended investigation of power brakes and appliances.

BRASS

Alpha-Beta, Heat Treatment of. Experiments on the Heat Treatment of Alpha-Beta Brass, O. W. Ellis and D. A. Schemnitz. Am. Inst. Min. & Met. Engrs.—Trans., Advance paper No. 1348–N, July 1924, 11 pp., 2 figs. Details of experiments carried out mainly with view of determining whether precipitation of soft particles within a supersaturated solid solution would not enhance its hardness. Effect of reheating quenched alpha-beta brass on its microstructure; results of reheating quenched alpha-beta brass at 100 deg., 200 deg. and 300 deg. cent.; aging at room temperature.

Foundry Mixtures, Nickel Additions to. The Advantage of Nickel Additions to Brass Foundry Mixtures, W. M. Corse. Metal Industry (Lond.), vol. 25, no. 3, July 18, 1924, pp. 79–80. Discusses advantages of nickel additions and gives typical examples of benefit derived. Lecture before Metropolitan Brassfounders' Assn., New York.

BUILDING CONSTRUCTION

Fireproof. Analysis of Cost of Types of Fireproof Construction, A. F. Klein. West. Soc. of Engrs.—Jl., vol. 29, no. 7, July 1924, pp. 290–300, 10 figs. Gives unit costs of different methods of fireproof construction of 3 types of buildings; analyzes 4 types of construction for 16-story hotel, 3 for light manufacturing building, and 3 for heavy warehouse.

Comparison of Types of Fireproof Construction, C. L. Post. West. Soc. of Engrs.—Jl., vol. 29, no. 7, July 1924, pp. 278–289, 11 figs. Compares types of fireproof construction covering foundations, columns and floor construction, hollow clay tile arches, reinforced-concrete joist construction, flat-slab construction, etc., recognizing fact that no universal rules can be laid down.

Machinery for. Machinery for Building Construction (Baumaschinen). Zeit. des Vereines deutscher Ingenieure, vol. 68, nos. 27, and 28, July 5 and 12, 1924, pp. 689–720 and 735–739, 74 figs. Series of articles describing types of dredges and excavators, automatic unloaders, cranes, locomobiles; compressed air and electricity as power; foundations, etc.

BUSES

Trolley. The Scope of the Trolley 'Bus, C. O. Silvers. Motor Transport (Lond.), vol. 39, no. 1010, July 7, 1924, pp. 13–14, 2 figs. Its advantages and disadvantages; traffic and mechanical requirements.

See also MOTOR BUSES.

C

CABLEWAYS

Portable. "Artex" Portable Ropeway. Indus. Mgt. (Lond.), vol. 11 (new series) no. 12, June 1924, pp. 325–326, 2 figs. Discusses Artex system built on monocableway system of transportation, including rope coupling by means of which endless-rope track can be

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Alphabetical List on page 156

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* Brown Hoisting Machinery Co.
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Cars, Industrial Railway
Easton Car & Construction Co.
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Link-Belt Co.

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* Croll-Reynolds Engineering Co.
* Edward Valve & Mfg. Co.

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Buffalo Bronze Die Casting Corp'n

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* Doehler Die-Casting Co.
Veeder Mfg. Co.

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Tolhurst Machine Works

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Tolhurst Machine Works
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Palmer-Bee Co.

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* Medart Co.
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* Western Engineering & Mfg. Co.
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Link-Belt Co.
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* General Electric Co.

Coal Mining Machinery
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* Ingersoll-Rand Co.

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Chain Belt Co.
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* Wayne Tank & Pump Co.
* Worthington Pump & Machinery Corp'n

Compressors, Air, Centrifugal
* De Laval Steam Turbine Co.
* General Electric Co.

Compressors, Air, Compound
* Ingersoll-Rand Co.
* Nordberg Mfg. Co.
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* Frick Co. (Inc.)
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* Vilter Mfg. Co.
* Vogt, Henry Machine Co.
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* General Electric Co.
* Ingersoll-Rand Co.
* Nordberg Mfg. Co.
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*Catalogue data of firms marked * appear in the A.S.M.E. Condensed Catalogues of Mechanical Equipment, 1923-24 Volume*

shortened or lengthened for altering scope and position of conveyor.

CAR HOUSES

Design. Fort Wayne Builds Modern Carhouse. Elec. Ry. Jl., vol. 64, no. 6, Aug. 9, 1924, pp. 191–194, 7 figs. Details of design and construction of car house of Indiana Service Corp., giving facilities for inspection repairs and storage.

CAR LIGHTING

Maintenance Methods. Light, Not Lamps, Determines Economy of Car Lighting, E. E. Dorting. Elec. Ry. Jl., vol. 64, no. 3, July 19, 1924, pp. 80–82, 2 figs. Analysis shows light to be thing purchased in car lighting; old lamps should be discarded; lamps and power for lighting cars cost Interborough Rapid Transit Co. $125,964 per yr.

CARS

Air-Compressor. Mobile, Self-Contained Compressor Car for Railroad Service, C. S. Kulp. Compressed Air Mag., vol. 29, no. 8, Aug. 1924, p. 955, 3 figs. Details of compressor car outfit consisting of two type POV-2 compressors directly connected to 50 hp. engine, single-cylinder horizontal type operating on 4-stroke cycle.

Dynamometer. Dynamometer Cars of the Swiss Federal Railways (Le wagon-dynamomètre des Chemins de fer fédéraux suisses). Génie Civil, vol. 84, no. 24, June 14, 1924, pp. 571–573, 3 figs. Design and construction of cars; measuring devices and arrangement, including dynamometer, tachometer, anemometer, ergometer, apparatus for measuring drawbar pull, braking force, spreading of rails, etc.

CARS, FREIGHT

Logging. Interesting Design of Logging Car. Ry. Rev., vol. 75, no. 3, July 19, 1924, pp. 92–94, 2 figs. Chicago, Milwaukee & St. Paul Ry. builds in its own shops skeleton flat cars for logging service.

Repairing. Unit System for Freight Car Repairs, J. McClennan. Ry. Mech. Engr., vol. 98, no. 7, July 1924, pp. 419–420. Gives proposed form for reporting freight-car repair output for comparison by piece-work-labor cost system; fixed applied piece-work labor costs per car used as basis of output

CARS, PASSENGER

Design. Improvements in Passenger Car Construction, C. E. Barba. Ry. Mech. Engr., vol. 98, no. 8, Aug. 1924, pp. 479–481. Work of building and maintenance may be facilitated by adopting uniform equipment designs.

Interurban. Luxurious Cars for Interurban Service. Elec. Ry. Jl., vol. 64, no. 6, Aug. 9, 1924, pp. 199–201, 5 figs. Describes parlor car and coach built by Milwaukee Electric Ry. & Light Co.; semi-observation front and inclosed observation platform at rear.

Parlor. Parlor Car Service. Elec. Traction, vol. 20, no. 7, July 1924, pp. 301–302, 4 figs. Cars were designed and constructed at Highland Park shops of Detroit United Ry.; old trailer cars formerly operating on Pontiac division were converted into parlor cars.

Sleepers. The Oriental Limited—Great Northern Railway. Ry. Jl., vol. 30, no. 7, July 1924, pp. 18–20, 4 figs. Describes new all-steel trains of most modern type built by Pullman Co., embodying latest designs and improvements in sleeping car improvement, in transcontinental service between Chicago and Pacific Northwest cities.

Toronto, Hamilton & Buffalo Ry. New Passenger Equipment for the T. H. & B. Ry. Mech. Engr., vol. 98, no. 7, July 1924, pp. 422–424, 8 figs. Also Can. Ry. & Mar. Wld., no. 317, July 1924, pp. 343–344, 2 figs. 26 all-steel cars to be used in passenger service between Toronto, Ont., and Buffalo, N. Y. were built by Can. Car & Foundry Co., Ltd., Montreal, Que. for Toronto, Hamilton & Buffalo Ry. Equipment consists of 10 first-class coaches, 10 smoking coaches and 6 baggage cars, steel construction and equipped with clasp brakes.

CARS, REFRIGERATOR

French. Refrigerator Cars on the French System (Les wagons frigorifiques), M. A. Sigmann. Revue Générale des Chemins de Fer, vol. 43, no. 6, June 1924, pp. 399–417, 9 figs. Development of refrigerator cars; design and construction of isothermic cars of Orleans Railway; transportation of fruit, meat, milk, etc.

CAST IRON

Formulas. Cast Iron Formulae. Metal Industry (Lond.), vol. 25, no. 2, July 11, 1924, pp. 35–37, 3 figs. Use of formulas which purport to give relative proportions of the various constituents, particularly silicon-carbon relations. Criticizes specific formulas which have been proposed. Tenor of author's conclusions seems to be that all such formulas are more dangerous than useful.

Porosity. Porosity in Cast Iron, A. Marks. Foundry Trade Jl., vol. 30, no. 412, July 10, 1924, pp. 25–27, 8 figs. Also Metal Industry (Lond.), vol. 25, no. 3, July 18, 1924, pp. 61–62. Discusses graphite, shrinkage, gas, and dirt porosity and concludes that there is no single cause or cure of porosity in castings. Each case has to be dealt with on first principles and molding, feeding, chilling and metal all attended to.

Shrinkage. Shrinkage. Metal Industry (Lond.), vol. 25, no. 3, July 18, 1924, pp. 83–86, 3 figs. Discusses chief phenomena and causes of shrinkage in cast iron. Deals at some length with classic work of Keep.

The Influence of Various Elements on the Shrinkage of Cast Iron and Steel, I. Jaederstroem. Testing, vol. 1, no. 4, Apr. 1924, pp. 290–307, 16 figs. Shows influence on shrinkage exerted by carbon, silicon, manganese, phosphorus, sulphur, nickel and chromium, determined by varying percentage of one element at a time.

Solidification and Cooling, Chemical Equilibria During. Chemical Equilibria During Solidification and Cooling of White Cast Iron, H. A. Schwartz and Anna N. Hird. Am. Inst. Min. & Met. Engrs.—Trans., Advance paper No. 1356-S, July 1924, 4 pp. By analyzing cementite separated electrolytically from white cast iron of known composition and history, distribution of silicon between austenite and cementite during and after freezing has been followed. Results constitute a contribution to our knowledge of equilibria in ternary system iron-carbon-silicon. Information also obtained regarding distribution of manganese, silicon, and phosphorus, when only relatively small amounts of each are present.

CASTINGS

Structure of. Surface Structure Versus Inner Structure of Metals, V. N. Krivobok and O. E. Romig. Am. Soc. for Steel Treating—Trans., vol. 6, no. 1, July 1924, pp. 66–76, 11 figs. Discusses structures which appear on surface of cast metals and their relation to inner crystalline organization of metal; variety of surface structures and danger of erroneous conclusions based on them solely.

CENTRAL STATIONS

Chicago, Ill. Calumet and Crawford Ave. Stations of the Commonwealth Edison Co., Chicago, Ill., W. F. Sims. Iron & Steel Engr., vol. 1, no. 7, July 1924, pp. 382–386, 5 figs. General layout, coal-handling equipment, boiler plant, feedwater system, switchhouse, connection with other stations.

Great Britain. The North Tees Power Station. Elec. Rev., vol. 95, no. 2432, July 4, 1924, pp. 18–22, 8 figs. Describes equipment of North Tees Station, unit of Northeastern Power Co.; boiler arrangement; 20,000-kw. turbo-generators, by Metropolitan-Vickers.

Operating-Costs Analysis. How to Analyze the Operating Costs in a Municipal Electric System, G. F. Drewry. Elec. News, vol. 33, nos. 13 and 14, July 1 and 15, 1924, pp. 54–55 and 55–56. Advantages of cost analysis; cost of power can be definitely distributed; power factor must be taken into account.

Parsons Line. Some Opinions on the "Parsons Line." Power Engr., vol. 19, no. 220, July 1924, pp. 251–253, 4 figs. Number of expressions by station engineers regarding value of this method of checking operating results.

Practice. General Review of Current Practice, P. Junkersfeld and G. A. Orrok. Combustion, vol. 11, no. 2, Aug. 1924, pp. 125–129, 3 figs. Current practice in power-plant field reviewed with particular reference to central stations. Compact chart indicating equipment in 22 of the most modern plants in United States. Paper presented at World Power Conference in London, July 1924.

Pulverized-Coal Burning. Thiers Central Station Fired with Pulverized Coal (Station centrale de Thiers chauffée au charbon pulvérisé), M. L. Champy. Annales des Mines, vol. 5, no. 5, May 1924, pp. 291–317, 3 figs. Storing, drying, and conveying of pulverized coal; combustion chamber, boilers, turbo-alternators, switching facilities and tests made; plant was particularly constructed to use a fuel which was otherwise useless because it was too fine.

Remodeling. Modern Equipment Reduces Cost of Power. Power, vol. 60, no. 6, Aug. 5, 1924, pp. 210–211, 2 figs. Steam equpiment of Abbeville, La., municipal light plant replaced by Diesels; cost of generating current reduced; water works served by motor-driven centrifugal pumps and air lift.

Southampton, England. Developments at Southampton, W. G. Turner. Electrician, vol. 93, no. 2411, Aug. 1, 1924, pp. 130–131, 1 fig. Details of extension of power station and area of supply, new 5000- and 6000-kw. turbo-generators.

CENTRIFUGAL MACHINES

British Empire Exhibition. Centrifugal Machines at the British Empire Exhibition. Engineering, vol. 117, no. 3052, June 27, 1924, pp. 817–820, 12 figs. partly on supp. plate. Describes different machines exhibited.

CHAINS

Silent, Manufacture of. The Story of Morse Chain, C. G. Priebe. Am. Mach., vol. 60, nos. 20, 22, 24 and 26, and vol. 61, nos. 2 and 4, May 15, 29, June 12, 26, July 10 and 24, 1924, pp. 737–740, 811–814, 887–889, 959–962, 69–71 and 145–148, 50 figs. May 15: Development of chain and its manufacture; growth of Morse Chain Co.; layout of units of plant. May 29: How sprocket wheels are made. June 12: Drawing operations; forming pin stock; carbonizing; presswork in pins. June 26: How links are stamped out and hardened. July 10: How chain is assembled, riveted, inspected and packed for shipment. July 24: Typical applications of silent chain for power transmission.

CHIMNEYS

Draft Calculations. Theory of Draft (Théorie du tirage), N. Peters. l'Association des Ingénieurs Sortis des Ecoles Spéciales de Gand—Annales, vol. 14 (Series 5), 1924, pp. 129–140. Formulas for calculating dimensions of stacks, heat losses, etc.

Size Determination. How to Determine the Proper Size of Chimney, T. S. Clark. Power, vol. 60, no. 5, July 29, 1924, pp. 175–179, 1 fig. Explains in a practical manner necessary elements for determining proper size of chimney for a given installation. Includes typical examples.

CHROME STEEL

Properties. Chromium—Its Uses and Its Alloys, W. M. Mitchell. Forging—Stamping—Heat Treating, vol. 10, no. 8, Aug. 1924, pp. 303–306, 13 figs. Chromium in steel lessens thermal conductivity; property is of importance when heat treating large forgings.

CHROME-NICKEL STEEL

Carbides. The Carbides in Nickel Chromium Steels, J. H. Andrew and H. Hyman. West of Scotland Iron & Steel Inst.—Jl., vol. 31, parts 6 & 7, Mar.-Apr. 1923–1924, pp. 116–123, 10 figs. Discusses analysis of carbides in samples water-quenched from 770 deg. cent. and tempered at 650 deg. cent. for 3 hr., and water quenched from 1200 deg. cent. and tempered at 650 deg. cent. for 3 hr.

Non-Rusting. Non-Rusting Chromium-Nickel Steels, B. Strauss. Am. Soc. for Testing Matls., Preprint of paper presented at meeting June 24–27, 1924, No. 19e, 10 pp., 5 figs. Valuable properties of chromium as an alloy with iron and steel, and experiments which led to development of two chromium-nickel steels in Physical Research Laboratory of Messrs. Krupp, Germany; results of corrosion tests, physical and metallographic properties, properties under elevated temperatures, and applications of these steels.

CLUTCHES

Design. Considerations in Clutch Design, A. Clegg. Machy. (Lond.), vol. 24, no. 614, July 3, 1924, pp. 436–438, 5 figs. Conical clutches.

Plate and Coil Clutches, A. Clegg. Machy. (N. Y.) vol. 30, no. 12, Aug. 1924, pp. 953–955, 6 figs. Notes on design. Describes different types.

COAL HANDLING

Plants. Coal-Handling System, J. A. Beck. Combustion, vol. 11, no. 2, Aug. 1924, pp. 120–121, 3 figs. Description of apparatus installed at plant of Kansas Gas & Elec. Co. at Strauss, Kan., and of method of operation.

COMPRESSED AIR

Applications. Utilization of Compressed Air (Utilisation de l'air comprimé), P. E. Leroux. Arts et Métiers, vol. 77, nos. 42, 43 and 44, Mar., Apr. and May 1924, pp. 105–119, 135–157 and 174–185, 90 figs. Design, construction and operation of compressed-air shovels, tipples, conveyors, mine locomotives, etc.

Cotton Mills. Compressed Air Has Many Uses in the Cotton Mill, B. R. Burnham. Compressed Air Mag., vol. 29, no. 8, Aug. 1924, pp. 943–946, 10 figs. Illustrates some of varied ways in which engineering cunning has cheapened and increased production.

Foundry Equipment. Pneumatic Apparatus Speed Up Performance in the Foundry, S. G. Roberts. Compressed Air Mag., vol. 29, no. 7, July 1924, pp. 933–936, 13 figs. Discusses pneumatic equipment of Malleable Iron Fittings Co., Branford, Conn., including air operated riddles, knock-out vibrators, jet cleaners and sprayers, etc.

CONDENSERS, STEAM

Surface. Surface Condensers and Auxiliaries, J. P. Likiak. So. Engr., vol. 41, no. 5, July 1924, pp. 51–55, 11 figs. Size limit, arrangement of passes, method of tube packing and methods of cleaning tubes.

CONVEYORS

Factory. Increasing Production by Power Conveyors. Machy. (Lond.), vol. 24, no. 618, July 31, 1924, pp. 558–561, 5 figs. Conveyor installations that have proved their economy in plant manufacturing small parts.

Overhead. Monorails and Their Application (Les monorails et leurs applications). Usine, vol. 33, no. 25, June 21, 1924, pp. 25–29, 8 figs. Describes various telepher systems executed by Etablissements Tourtellier, Mulhouse. See also Génie Civil, vol. 85, no. 1, July 5, 1924, pp. 16–18, 3 figs.

Pneumatic. Economies of Pneumatic Conveyors for Factories (Wirtschaftlichkeit von Hausrohrpostanlagen), J. Fritz. Zeit. des Vereines deutscher Ingenieure, vol. 68, no. 26, June 28, 1924, pp. 681–683, 7 figs. Discusses principal types of conveyor systems for handling papers and small articles within building; operation of suction and pressure air plants.

Skip. Main Shaft Extraction by Means of Skips (Hauptschacht-Gefässförderungen), L. Schött. Zeit. des Vereines deutscher Ingenieure, vol. 68, nos. 26 and 28, June 28 and July 12, 1924, pp. 665–671 and 729–731, 21 figs. Discusses advantages of skip conveying with automatic emptying at upper end for main shaft operation, and describes plants at Caen (France), Diedenhofen, etc., with capacity of 250–300 tons per hr.

CORROSION

Electrolytic. The Electrolytic Theory of Corrosion, W. D. Bancroft. Physical Chem.—Jl., vol. 28, no. 8, Aug. 1924, pp. 785–871. Reviews electrolytic theory and criticizes some conclusions based on it.

COST ACCOUNTING

Function of, Measuring. Evaluating the Cost Department. Mech. Eng., vol. 46, no. 8, Aug. 1924, pp. 477–479. Varying views of cost accountants, engineers, and others on possibility of measuring cost-accounting function.

COSTS

Machine Shop, Estimating. How to Estimate Machine Shop Costs, A. A. Dowd. Am. Machinist, vol. 61, no. 6, Aug. 7, 1924, pp. 227–230, 3 figs. Estimates of machining time on spline-milling operations; practical examples of keyway and slot cutting; gear milling and hobbing estimates.

COUNTERBORES

Manufacture of. Manufacturing Interchangeable Counterbores. Machy. (N. Y.), vol. 30, no. 12, Aug. 1924, pp. 943–947, 15 figs. Unusual operations and fixtures employed by Gairing Tool Co., Inc., Detroit, Mich., in making counterbores and holders.

CRANES

Crawler. Crawler Crane Built for First Time in Canada, H. P. Armson. Can. Machy., vol. 32, no. 3, July 17, 1924, pp. 19–21 and 42, 3 figs. Designed and

Manufactured by Advertisers — CLASSIFIED LIST OF MECHANICAL EQUIPMENT — Alphabetical List on page 156

Conveying Systems, Powdered Coal
Grindle Fuel Equipment Co.

Conveyor Systems, Pneumatic
* Allington & Curtis Mfg. Co.
* Sturtevant, B. F. Co.

Conveyors, Belt
* Brown Hoisting Machinery Co.
Chain Belt Co.
Gandy Belting Co.
* Gifford-Wood Co.
Link-Belt Co.

Conveyors, Bucket, Pan or Apron
* Brown Hoisting Machinery Co.
Chain Belt Co.
* Gifford-Wood Co.
* Jones, W. A. Fdry. & Mach. Co.
Link-Belt Co.

Conveyors, Chain
* Brown Hoisting Machinery Co.
Chain Belt Co.
Link-Belt Co.

Conveyors, Ice
Chain Belt Co.
* Gifford-Wood Co.
Link-Belt Co.

Conveyors, Portable
* Gifford-Wood Co.
Link-Belt Co.

Conveyors, Screw
Chain Belt Co.
* Gifford-Wood Co.
Link-Belt Co.

Cooling Ponds, Spray
* Cooling Tower Co. (Inc.)
* Schutte & Koerting Co.

Cooling Towers
* Burhorn, Edwin Co.
* Cooling Tower Co. (Inc.)
* Wheeler, C. H. Mfg. Co.
* Wheeler Condenser & Engrg. Co.
* Worthington Pump & Machinery Corp'n

Copper, Drawn
* Roebling's, John A. Sons Co.

Copper Converting Machinery
* Allis-Chalmers Mfg. Co.
* Worthington Pump & Machinery Corp'n

Counters, Revolution
* American Schaeffer & Budenberg Corp'n
* Ashton Valve Co.
* Bristol Co.
* Crosby Steam Gage & Valve Co.
Veeder Mfg. Co.

Countershafts
* Builders Iron Foundry
Hill Clutch Machine & Fdry. Co.
* Royersford Fdry. & Mach. Co.
* Wood's, T. B. Sons Co.

Couplings, Pipe
Byers, A. M. Company
* Central Foundry Co.
* Crane Co.
Lunkenheimer Co.

Coupling, Shaft (Flexible)
* Allis-Chalmers Mfg. Co.
* Brown, A. & F. Co.
* Falk Corporation
* Fawcus Machine Co.
* Foote Bros. Gear & Machine Co.
Hill Clutch Machine & Fdry. Co.
* Jones, W. A. Fdry. & Mach. Co.
* Medart Co.
* Nordberg Mfg. Co.
Nuttall, R. D. Co.
* Smith & Serrell

Coupling, Shaft (Rigid)
* Allis-Chalmers Mfg. Co.
* Brown, A. & F. Co.
Chain Belt Co.
Cumberland Steel Co.
* Falls Clutch & Machinery Co.
Farrel Foundry & Machine Co.
* General Electric Co.
Hill Clutch Machine & Fdry. Co.
* Jones, W. A. Fdry. & Mach. Co.
Link-Belt Co.
* Medart Co.
* Royersford Fdry. & Mach. Co.
* Smith & Serrell
* Wood's, T. B. Sons Co.

Couplings, Universal Joint
* Wood's, T. B. Sons Co.

Coverings, Steam Pipe
Carey, Philip Co.
Johns-Manville (Inc.)

Cranes, Electric Traveling
Palmer-Bee Co.
* Whiting Corporation

Cranes, Floor (Portable)
Lidgerwood Mfg. Co.

Cranes, Gantry
* Brown Hoisting Machinery Co.
Link-Belt Co.
* Whiting Corp'n

Cranes, Hand Power
* Brown Hoisting Machinery Co.
Clyde Iron Works Sales Co.
Palmer-Bee Co.
* Whiting Corp'n

Cranes, Jib
* Brown Hoisting Machinery Co.
Palmer-Bee Co.
* Whiting Corp'n

Cranes, Locomotive
* Brown Hoisting Machinery Co.
Link-Belt Co.

Cranes, Locomotive (Crawler)
Link-Belt Co.

Cranes, Pillar
* Brown Hoisting Machinery Co.
* Whiting Corp'n

Cranes, Portable
* Brown Hoisting Machinery Co.
Clyde Iron Works Sales Co.
Link-Belt Co.

Crucibles, Graphite
Dixon, Joseph Crucible Co.

Crushers, Clinker
Farrel Foundry & Machine Co.

Crushers, Coal
* Allis-Chalmers Mfg. Co.
* Brown Hoisting Machinery Co.
* Gifford-Wood Co.
Link-Belt Co.
Pennsylvania Crusher Co.
* Smidth, F. L. & Co.
* Worthington Pump & Machinery Corp'n

Crushers, Hammer
Pennsylvania Crusher Co.

Crushers, Jaw
Farrel Foundry & Machine Co.
* Worthington Pump & Machinery Corp'n

Crushers, Ore and Rock
Farrel Foundry & Machine Co.
* Nordberg Mfg. Co.
Pennsylvania Crusher Co.

Crushers, Roll
Link-Belt Co.
Pennsylvania Crusher Co.
* Worthington Pump & Machinery Corp'n

Crushing and Grinding Machinery
* Allis-Chalmers Mfg. Co.
Farrel Foundry & Machine Co.
Pennsylvania Crusher Co.
* Smidth, F. L. & Co.
* Worthington Pump & Machinery Corp'n

Cupolas
* Bigelow Co.
* Whiting Corp'n

Cutters, Bolt
* Landis Machine Co. (Inc.)

Cutters, Milling
* Whitney Mfg. Co.

Dehumidifying Apparatus
* American Blower Co.
* Carrier Engineering Corp'n

Derricks and Derrick Fittings
Clyde Iron Works Sales Co.
Lidgerwood Mfg. Co.

Diaphragms, Rubber
* United States Rubber Co.

Die Castings
(See Castings, Die Molded)

Die Heads, Thread Cutting (Self-opening)
* Jones & Lamson Machine Co.
* Landis Machine Co. (Inc.)

Dies, Punching
* Niagara Machine & Tool Works

Dies, Sheet Metal Working
* Niagara Machine & Tool Works

Dies, Stamping
* Niagara Machine & Tool Works

Dies, Thread Cutting
* Jones & Lamson Machine Co.
* Landis Machine Co. (Inc.)

Diesel Engines
(See Engines, Oil, Diesel)

Digesters
* Bigelow Co.

Distilling Apparatus
* Vogt, Henry Machine Co.

Drafting Room Furniture
Dietzgen, Eugene Co.
Economy Drawing Table & Mfg. Co.
Keuffel & Esser Co.

Drafting Room Furniture
New York Blue Print Paper Co.
ParVell Laboratories
U. S. Blue Co.
Weber, F. Co. (Inc.)

Drawing Instruments and Materials
Alteneder, Theo. & Sons
Dietzgen, Eugene Co.
Keuffel & Esser Co.
New York Blue Print Paper Co.
ParVell Laboratories
U. S. Blue Co.
Weber, F. Co. (Inc.)

Dredges, Hydraulic
* Morris Machine Works

Dredging Machinery
Lidgerwood Mfg. Co.
* Morris Machine Works

Dredging Sleeve
* United States Rubber Co.

Drilling Machines, Sensitive
* Royersford Fdry. & Mach. Co.

Drilling Machines, Vertical
* Royersford Fdry. & Mach. Co.

Drills, Coal and Slate
* General Electric Co.
* Ingersoll-Rand Co.

Drills, Core
* Ingersoll-Rand Co.

Drills, Rock
* General Electric Co.
* Ingersoll-Rand Co.

Drinking Fountains, Sanitary
Johns-Manville (Inc.)

Dryers, Coal
Grindle Fuel Equipment Co.

Dryers, Rotary
* Bigelow Co.
Farrel Foundry & Machine Co.
Link-Belt Co.
* Sturtevant, B. F. Co.

Drying Apparatus
* American Blower Co.
* Carrier Engineering Corp'n
* Clarage Fan Co.
* Sturtevant, B. F. Co.

Dust Collecting Systems
* Allington & Curtis Mfg. Co.
* Allis-Chalmers Mfg. Co.
* Clarage Fan Co.
* Sturtevant, B. F. Co.

Dust Collectors
* Allington & Curtis Mfg. Co.
* Allis-Chalmers Mfg. Co.
* Sturtevant, B. F. Co.

Dynamometers
* American Schaeffer & Budenberg Corp'n
* General Electric Co.
* Wheeler, C. H. Mfg. Co.

Economizers, Fuel
* Green Fuel Economizer Co.
* Power Specialty Co.
* Sturtevant, B. F. Co.

Ejectors
* Schutte & Koerting Co.

Electrical Machinery
* Allis-Chalmers Mfg. Co.
* General Electric Co.
* Westinghouse Electric & Mfg. Co.

Electrical Supplies
* General Electric Co.
Johns-Manville (Inc.)

Elevating and Conveying Machinery
* Brown Hoisting Machinery Co.
Chain Belt Co.
* Gifford-Wood Co.
* Jones, W. A. Fdry. & Mach. Co.
Link-Belt Co.
Palmer-Bee Co.

Elevators, Bucket & Chain
Gandy Belting Co.

Elevators, Hydraulic
* Whiting Corp'n

Elevators, Pneumatic
* Whiting Corp'n

Elevators, Portable
* Gifford-Wood Co.
Link-Belt Co.

Elevators, Telescopic
Link-Belt Co.

Emery Wheel Dressers
* Builders Iron Foundry

Engine Repairs
* Franklin Machine Co.
* Nordberg Mfg. Co.

Engine Stops
Golden-Anderson Valve Specialty Co.
* Schutte & Koerting Co.

Engines, Blowing
* Allis-Chalmers Mfg. Co.
Mackintosh-Hemphill Co.
* Nordberg Mfg. Co.
* Worthington Pump & Machinery Corp'n

Engines, Gas
* Allis-Chalmers Mfg. Co.
* De La Vergne Machine Co.
* Ingersoll-Rand Co.
* Titusville Iron Works Co.
* Westinghouse Electric & Mfg. Co.

Engines, Gasoline
* Sturtevant, B. F. Co.
* Titusville Iron Works Co.
* Worthington Pump & Machinery Corp'n

Engines, Hoisting
* Allis-Chalmers Mfg. Co.
Clyde Iron Works Sales Co.
Lidgerwood Mfg. Co.
* Morris Machine Works
* Nordberg Mfg. Co.

Engines, Kerosene
* Worthington Pump & Machinery Corp'n

Engines, Marine
Bethlehem Shipbldg.Corp'n(Ltd.)
* Ingersoll-Rand Co.
Johnson, Carlyle Machine Co.
* Nordberg Mfg. Co.
* Sturtevant, B. F. Co.
* Worthington Pump & Machinery Corp'n

Engines, Marine, Oil
Bethlehem Shipbldg.Corp'n(Ltd.)
* Ingersoll-Rand Co.
* Nordberg Mfg. Co.

Engines, Marine, Steam
Bethlehem Shipbldg.Corp'n(Ltd.)
* Nordberg Mfg. Co.

Engines, Oil
* Allis-Chalmers Mfg. Co.
Bethlehem Shipbldg.Corp'n(Ltd.)
* De La Vergne Machine Co.
* Ingersoll-Rand Co.
* Nordberg Mfg. Co
* Titusville Iron Works Co.
* Worthington Pump & Machinery Corp'n

Engines, Oil, Diesel
* Allis-Chalmers Mfg. Co.
Bethlehem Shipbldg.Corp'n(Ltd.)
* Nordberg Mfg. Co.
* Worthington Pump & Machinery Corp'n

Engines, Pumping
* Allis-Chalmers Mfg. Co.
* Ingersoll-Rand Co.
* Morris Machine Works
* Nordberg Mfg. Co.
* Worthington Pump & Machinery Corp'n

Engines, Steam
* Allis-Chalmers Mfg. Co.
* American Blower Co.
Bethlehem Shipbldg.Corp'n(Ltd.)
* Clarage Fan Co.
Clyde Iron Works Sales Co.
* Cole, R. D. Mfg. Co.
* Engberg's Electric & Mech. Wks.
* Erie City Iron Works
* Harrisburg Fdry. & Mach. Wks.
* Ingersoll-Rand Co.
* Leffel, James & Co.
Lidgerwood Mfg. Co.
Mackintosh-Hemphill Co.
* Morris Machine Works
* Nordberg Mfg. Co.
Ridgway Dynamo & Engine Co.
* Skinner Engine Co.
* Sturtevant, B. F. Co.
* Titusville Iron Works Co.
* Troy Engine & Machine Co.
* Vilter Mfg. Co.
* Westinghouse Electric & Mfg. Co.
* Wheeler, C. H. Mfg. Co.

Engines, Steam, Automatic
* American Blower Co.
* Clarage Fan Co.
* Engberg's Electric & Mech. Wks.
* Erie City Iron Works
* Harrisburg Fdry. & Mach. Wks
* Leffel, James & Co.
Ridgway Dynamo & Engine Co.
* Skinner Engine Co.
* Sturtevant, B. F. Co.
* Troy Engine & Machine Co.
* Westinghouse Electric & Mfg. Co.

Engines, Steam, Corliss
* Allis-Chalmers Mfg. Co.
* Franklin Machine Co.
* Frick Co. (Inc.)
* Harrisburg Fdry. & Mach. Wks.
Mackintosh-Hemphill Co.
* Nordberg Mfg. Co.
* Vilter Mfg. Co.

*Catalogue data of firms marked * appear in the A.S.M.E. Condensed Catalogues of Mechanical Equipment, 1923-24 Volume*

built by J. T. Hepburn, Ltd., Toronto, for service in civic yards.

Traveling. A Special Running Shed Crane Equipment on the Pennsylvania Railway. Ry. Gaz., vol. 41, no. 2, July 11, 1924, p. 43, 3 figs. Particulars of ten-ton electric overhead traveling crane, operating on circular track and having all wheels of same diameter, at Columbus, O., engine-house of Penna. Ry.

CRANKSHAFTS

Explosion-Engine, Resonance of. Experimental Demonstration and Exact Measurement of Resonance of Crankshafts of Explosion Engines; Rôle of Flywheel; Favorable Effects of Elastic Coupling (Démonstration expérimentale et mesure précise des phénomenès de résonance propre des arbresmanivelles des moteurs à explosion; rôle du volant; influence favorable d'un accouplement élastique), A. Blondel and H. Harle. Académie des Sciences—Comptes Rendus des Séances, vol. 178, no. 18, Apr. 28, 1924, pp. 1442–1452, 4 figs. Results of experiments to measure resonance in crankshafts at various speeds and comparison of results with theory.

CURVES

Hyperbolic. Plotting Hyperbolic Transformation Curves (Note sur le tracé des courbes hyperboliques de transformation, dans le diagramme). Arts et Métiers, vol. 77, no. 44, May 1924, pp. 170–173, 3 figs. Discusses Brauer's curve showing volume and absolute pressure of gas varying in geometric progression; plotting of hyperbolic curves by means of logarithmic auxiliary curve.

CYLINDERS

Motorcycle. Making Motorcycle Cylinders. Foundry, vol. 52, no. 15, Aug. 1, 1924, pp. 589–590, 5 figs. Work is cast in two-or three part molds; pouring effected in many different ways; special device used for stripping fins into pattern of cylinder barrel.

D

DIRECTION FINDING

Unilateral. A New Unilateral Radiogoniometer (Un nouveau radiogonionetre avec levée du dute), E. Bellini. l'Onde Électrique, vol. 3, no. 29, May 1924, pp. 233–253, 19 figs. Describes a new device for direction finding.

DIES

Drawing. Designing Drawing Dies. Machy. (Lond.), vol. 24, nos. 611 and 614. June 12 and July 3, 1924, pp. 341–344 and 422–426, 14 figs. Radii over which metal can be drawn, type of equipment used, operation of drawing die, design of first-operation die, die for final drawing operation, design of blank holders, computing blank diameter of shells of unusual shapes, determining number of operations required, combination die for blanking and drawing, troubles encountered in drawing light-gage metal, etc.

DIESEL ENGINES

Central-Station. Diesel Engines Turn Tables on Central Station. Oil Engine Power, vol. 2, no. 7, July 1924, pp. 366–370, 6 figs. Atlantic Wire Co., Branford, Conn. changed power source from steam plant to Diesel-engine drive; costs chargeable are considerably less per kw-hr. than purchased current cost; two six-cylinder Lombard Diesel engines rated to develop 180 h. hp. each and direct-connected to two Westinghouse 3-phase 200 kva. alternators and 10-kw. direct-connected exciters.

Double-Acting. A New Type of Double-Acting Diesel Engine for Marine Purposes, G. J. Lugt and H. Hunter. Engineering, vol. 118, no. 3053, July 4, 1924, pp. 26–30, 8 figs. Also Engineer, vol. 138, no. 3575, July 4, 1924, pp. 23–24, 6 figs; and Shipbldg. & Shipping Rec., vol. 24, no. 1, July 3, 1924, pp. 7–11, 5 figs. Details of design and construction of new type of four-cycle double-acting engines, developing about 80 per cent more power than single-acting engines of same size, using Arschaouloff's system of solid injection. Piston diam., 31½ in.; stroke, 55 in.; hp. in single cyl. at 95 r.p.m., 600. Paper read at joint meeting of Instn. Naval Architects, Instn. Engrs. and Shipbldrs. in Scotland and N. E. Coast Instn. Engrs. & Shipbldrs. in London, June 27, 1924.

North-Eastern Werkspoor Diesel Engine. Steamship, vol. 36, no. 421, July 1924, pp. 18–21, 4 figs. Describes direct-coupled, double-acting, heavy-oil engine for marine purposes built by North-Eastern Marine Eng. Co.'s works at Wallsend-on-Tyne; four-cycle, single-cylinder unit of 1000 i.hp.

Tests of New Double-Acting Development Cylinder. Motorship, vol. 9, no. 8, Aug. 1924, pp. 578–579, 5 figs. As result of shop tests of first single-cylinder, double-acting type of four-cycle Diesel engine built at Wallsend-on-Tyne, Eng., by North-Eastern Marine Eng. Co., in collaboration with Werkspoor of Amsterdam, Alfred Holt & Co., Liverpool, have ordered a 4000-s.hp. engine for single-screw motorship.

Great Britain. Diesel Engine Progress in Great Britain. Pac. Mar. Rev., vol. 21, no. 8, Aug. 1924, pp. 411–414, and 417, 11 figs. Discusses increased application of Diesel engines for all types of ships, types of Diesel, pros and cons.

Heavy-Oil Burning. Burning Heavy Fuel Oil in Diesel Engines, R. Hildebrand. Power House, vol. 17, no. 14, July 20, 1924, pp. 26 and 39, 1 fig. Satisfactory results were obtained with small three-cylinder, single-acting, four-stroke vertical engine developing 200 h.hp. at 257 r.p.m.

Replaces Water Power. Municipality Replaces Water-Power with Oil Engines. Oil Engine Power, vol. 2, no. 7, July 1924, pp. 379–380 and 385, 3 figs. When city of Marshall, Mich., began to grow so fast that all available water flow was used up in attempt to keep pace with increasing power demands, electric current was purchased outside at moderate rates. Subsequent steep rises in cost of purchased power made city turn to oil-engine power, and Diesels since installed have netted big operating gains.

Scavenging Blowers for. Centrifugal Scavenging Blowers for Two-Cycle Marine Diesel Engines, E. Klingelfuss. Brown Boveri Rev., vol. 11, no. 4, Apr. 1924, pp. 67–80, 28 figs. Details of design and construction of centrifugal scavenging blowers, their advantages, and prime-movers for them; arrangement on board ship; operation in conjunction with Diesel engines.

Street-Car Power. Two 3600 B.hp. and Two 1500 B.hp. Diesels for Street-Car Power. Oil Engine Power, vol. 2, no. 7, July 1924, pp. 371–373, 2 figs. Consistent and economical service of two 1500-b.hp. Diesel engines over lengthy period, caused Shanghai Street-Car Co. to order two additional engines of 3600 b.hp. each to meet their greater power needs.

DRILLING MACHINES

Heavy-Duty, Possibilities of. Possibilities of Heavy-duty Drilling, H. L. Tigges. Machy. (N. Y.), vol. 30, no. 12, Aug. 1924, pp. 950–952, 5 figs. Points out possibilities of vertical heavy-duty drilling machine by presenting examples of work done in automobile plants. By term "heavy-duty drilling machine" is meant a machine with a box column.

E

EDUCATION, ENGINEERING

Power-Plant Engineering. Training Engineers for Alberta's Power Plants, R. M. Dingwall. Power House, vol. 17, no. 14, July 20, 1924, pp. 19–20 and 40–41, 3 figs. Provincial Inst. of Technology & Art, Calgary, Alberta gives complete course in mechanical engineering consisting of two terms of 8 mos. each; students devote 50 per cent of their time to practical work.

EDUCATION, INDUSTRIAL

Character and Extent. Education and Training for the Industries. Mech. Eng., vol. 46, no. 8, Aug. 1924, pp. 482–483. Investigation into character and extent of such training. Making industry attractive to high-school and college students. Labor as a means of social salvation.

ELECTRIC FURNACES

Induction. A Six-Ton Induction Furnace Installation, M. Unger. Gen. Elec. Rev., vol. 27, no. 8, Aug. 1924, pp. 498–503, 12 figs. Details of new General Electric Co. three-ton furnace and its auxiliaries, yielding high-grade melt of extreme uniformity.

Melting with. Melts in Twin Electric Furnaces, A. W. Bryant. Iron Trade Rev., vol. 75, no. 4, July 24, 1924, pp. 226–228, 4 figs. At plant of Kelley & Jones Co., Greensburg, Pa., who manufacture a line of plumbing and valve fittings in gray iron, steel, and malleable iron, two acid-lined units, 1½ tons capacity each, mounted on turntable 180 deg. apart and having single set of electrodes, provide small batches of hot metal at short, even intervals.

Pig-Iron. The New Norwegian Electric Pig Iron Furnace, F. Hodson and M. Sem. Jl. of Electricity, vol. 53, no. 3, Aug. 1, 1924, pp. 92–93, 4 figs. Results of tests made on new type of electric furnace; furnace was in operation continuously for period of year and a half during test.

ELECTRIC LOCOMOTIVES

Development. The Development of the Electric Locomotive, F. H. Shepard. Ry. Elec. Engr., vol. 15, no. 7, July 1924, pp. 225–236, 1 fig. World-wide summary of present-day practice as regards heavy electric traction.

Side Rods. Oblique Articulated Side Rods for Electric Locomotives, G. Darrieus. Brown Boveri Rev., vol. 11, no. 3, Mar. 1924, pp. 43–51, 9 figs. Describes statically determinate transmission system and its characteristics; successful experiments with oblique articulated rods up to highest speeds.

South African Railways. Electric Locomotives for South African Government Railways. Tramway & Ry. Wld., vol. 55, no. 30, June 19, 1924, pp. 285–290, 10 figs. Describes locomotives on main-line railway of Glencoe and Pietermaritzburg section of So. African Rys. which deal chiefly with hauling of heavy mineral traffic down to coast; A. A. + A. A. type; gage, 3 ft. 6 in.; equipped with four 300-hp. motors; weight, 66 tons 12 cwt.; overall length, 48 ft. 8½ in.; tractive effort, maximum, 40,000 lb.

2-8-2. The Pennsylvania 2-8-2 Type Electric Locomotive, W. H. Enunson. Railroad Herald, vol. 28, no. 8, July 1924, pp. 34a-34c, 3 figs. New single-phase electric locomotives for use in either freight or passenger service on 11,000-volt, 25-cycle alternating current, built and designed by Penna. Ry.

ELECTRIC WELDING, ARC

Safety Precautions. Using the Arc with Safety, D. H. Devoe. Welding Engr., vol. 9, no. 7, July 1924, pp. 28–29. Methods of protecting eyes and bodies of electric arc welding operators; safeguarding apparatus.

Systems. Electrical System of Welding, C. N. O. Dutton. So. African Inst. Elec. Engrs.—Trans., vol. 15, part 4, Apr. 1924, pp. 364–374, 18 figs. Gives short description illustrating their advantages for metals to be welded or treated by Bernados system, metallic-arc system, spot and butt welding, and metallic tipping or depositing by electric arc.

EMPLOYEES, TRAINING OF

Foremen. A Successful Experiment in Industrial Education, D. J. Roach. Chem. & Met. Eng., vol. 31, no. 7, Aug. 18, 1924, pp. 272–273. How one large company is training its foremen and operating bosses in economics, mathematics, and technology of its industry.

ENGINEERING

Human Factor in. The Human Factor in Engineering, S. C. Godfrey. Military Engr., vol. 16, no. 87, May-June 1924, pp. 180–183, 1 fig. Discusses "human engineering" or treatment of human tools with as much consideration as materials; including workers' councils, etc.

EVAPORATORS

Chemical Plants. Heating an Evaporator with the Exhaust from Condensing Engines, F. H. Nickle. Chem. & Met. Eng., vol. 31, no. 6, Aug. 11, 1924, pp. 226–228, 3 figs. Device designed to act as condenser for multi-expansion engines and evaporator for chemical plant service at same time.

Steam-Jacketed, Heat Transfer in. Heat Transfer in Steam-Jacketed Evaporators, H. L. Olin, M. H. Dowell and C. M. Toynbee. Chem. & Met. Eng., vol. 31, no. 3, July 21, 1924, pp. 116–119, 3 figs. Determining overall transmission and film coefficients as well as operating efficiencies on plant equipment over a wide range of industrial conditions. Paper read before Am. Inst. Chem. Engrs.

EXHAUST STEAM

Cost Calculation. How Shall We Calculate the Cost of Exhaust Steam? T. Fuwa. Chem. & Met. Eng., vol. 31, no. 4, July 28, 1924, p. 150. Comparison of four possible bases of evaluating exhaust steam and a discussion of advantages of each.

F

FANS

Installation. Auxiliary Equipment for Blast and Ventilating Fans, D. L. Hubbard. Mech. Wld., vol. 76, no. 1961, Aug. 1, 1924, pp. 70–72, 6 figs. Discusses proper foundations and supports, absorption of vibrations, preferably by means of cork slab; fan and motor noises; fan drives by steam engine and turbine; push-button control.

Mine. Principles of the Design of Mine Fans. Colliery Engr., vol. 1, nos. 4 and 5, June and July 1924, pp. 163–166 and 231–233, 11 figs. Study of fans suited to British colliery conditions. Principal features and functions of exhaustive ventilator, the typical kind of ventilator employed in British mines.

FEEDWATER HEATERS

Locomotive. Analysis of Feed Water Heating Devices, E. P. Gangewere. Ry. Mech. Engr., vol. 98, no. 7, July 1924, p. 409. Feedwater heaters with pumps take more heat from exhaust than exhaust-steam injector type.

FILES

Manufacture. Machinery and Methods in Modern File Making, H. P. Armson. Can. Machy., vol. 31, no. 27, July 3, 1924, pp. 19–23 and 44–45, 4 figs. Describes machinery and methods employed in plant of Nicholson File Co., at Port Hope, Ont.; 1200 doz. per day produced; 500 different sizes made. Forging, annealing, cutting, hardening and tempering all essential features.

FIRE EXTINGUISHERS

U. S. Specifications. United States Government Master Specification for Fire-Extinguishing Liquid (Carbon Tetrachloride Base). U. S. Dept. Commerce, Bur. Standards, circular no. 134, June 1, 1924, 6 pp. Specifications adopted July 3, 1922 for fire extinguishing liquid (carbon tetrachloride base), covering material and workmanship, inspection and testing, packing and marking, etc.

FIRE PROTECTION

Sprinklers. How the Fire Chief Regards Automatic Sprinklers, I. G. Hoagland. Fire & Water Eng., vol. 76, no. 6, Aug. 6, 1924, pp. 253–254 and 278–279. Replies to questionnaire asking for facts as to use chiefs make of this device; opinion as to its usefulness.

FLOORS

Loads. Strain of Swaying Crowds on Balcony Measured at Iowa. Eng. News-Rec., vol. 93, no. 6, Aug. 7, 1924, p. 231. Stress measurements in floor show effect more than doubled by jumping of excited, cheering students.

FLUE-GAS ANALYSIS

Scientific Methods. Scientific Flue Gas Analysis, D. Brownlie. Eng. & Boiler House Rev., vol. 38, no. 1, July 1924, pp. 3–5, 2 figs. Gives essential facts regarding true scientific methods necessary for flue-gas analysis.

FLYING BOATS

Aeromarine. The Aeromarine Model EO Sport Flying Boat, B. V. Korvin-Kroukovsky. Aviation, vol. 17, no. 6, Aug. 11, 1924, pp. 858–860, 3 figs. Details of design and construction of three-seater fitted with six-cylinder 70- to 80-hp. Anzani type 6A3 engine and tractor-type propeller.

All-Metal. All-Metal Flying Boats for Britain. Flight, vol. 16, no. 29, July 17, 1924, pp. 449–451, 5 figs. Describes Rohrback No. 11, twin-engined flying boat of cantilever-monoplane type; maximum speed, 120 m.p.h.

Manufactured by Advertisers — CLASSIFIED LIST OF MECHANICAL EQUIPMENT — Alphabetical List on page 156

Engines, Steam, High Speed
* American Blower Co.
* Clarage Fan Co.
* Engberg's Electric & Mech. Wks.
* Erie City Iron Works
* Harrisburg Fdry. & Mach. Wks.
* Nordberg Mfg. Co.
Ridgway Dynamo & Engine Co.
* Skinner Engine Co.

Engines, Steam, Poppet Valve
* Erie City Iron Works
* Nordberg Mfg. Co.
Ridgway Dynamo & Engine Co.
* Vilter Mfg. Co.

Engines, Steam, Throttling
* American Blower Co.
* Clarage Fan Co.
* Engberg's Electric & Mech. Wks.
Ridgway Dynamo & Engine Co.

Engines, Steam, Uni-Flow
* Frick Co. (Inc.)
* Harrisburg Fdry. & Mach. Wks.
* Nordberg Mfg. Co.
Ridgway Dynamo & Engine Co.
* Skinner Engine Co.

Engines, Steam, Variable Speed
* American Blower Co.
* Harrisburg Fdry. & Mach. Wks.
* Nordberg Mfg. Co.
Ridgway Dynamo & Engine Co.

Engines, Steam, Vertical (Fully Enclosed, Self-Oiling)
* American Blower Co.
* Clarage Fan Co.
* Engberg's Electric & Mech. Wks.
* Troy Engine & Machine Co.

Engines, Steering
Bethlehem Shipbldg.Corp'n(Ltd.)
Lidgerwood Mfg. Co.

Evaporators
Bethlehem Shipbldg.Corp'n(Ltd.)
* Croll-Reynolds Engrg. Co. (Inc.)
Farrel Foundry & Machine Co.
* Vogt, Henry Machine Co.
* Wheeler Condenser & Engrg. Co.

Excavating Machinery
Clyde Iron Works Sales Co.
Lidgerwood Mfg. Co.
Link-Belt Co.

Exhaust Heads
Hoppes Mfg. Co.

Exhaust Systems
* Allington & Curtis Mfg. Co.
* American Blower Co.
* Clarage Fan Co.
* Sturtevant, B. F. Co.

Exhausters, Gas
* American Blower Co.
* Clarage Fan Co.
* General Electric Co.
* Green Fuel Economizer Co.
* Ingersoll-Rand Co.
* Schutte & Koerting Co.
* Sturtevant, B. F. Co.

Extractors, Centrifugal
Tolhurst Machine Works

Extractors, Oil and Grease
* American Schaeffer & Budenberg Corp'n
* Kieley & Mueller (Inc.)

Fans, Exhaust
* American Blower Co.
* Clarage Fan Co.
* Coppus Engineering Corp'n
* General Electric Co.
* Green Fuel Economizer Co
* Sturtevant, B. F. Co.

Fans, Exhaust, Mine
* American Blower Co.
* Sturtevant, B. F. Co.

Feeders, Pulverized Fuel
* Combustion Engineering Corp'n
Grindle Fuel Equipment Co.
* Smidth, F. L. & Co.

Filters, Feed Water, Boiler
* Permutit Co.

Filters, Feed Water, Demulsifying
* Permutit Co.
Reisert Automatic Water Purifying Co.

Filters, Gravity
* Permutit Co.
Reisert Automatic Water Purifying Co.

Filters, Mechanical
* Permutit Co.

Filters, Oil
* Bowser, S. F. & Co. (Inc.)
Elliott Co.
* General Electric Co.
* Permutit Co.

Filters, Pressure
* Graver Corp'n
* Permutit Co.
Reisert Automatic Water Purifying Co.

Filters, Water
* Cochrane Corp'n
Elliott Co.
* Graver Corp'n
* Permutit Co.
Reisert Automatic Water Purifying Co.
* Scaife, Wm. B. & Sons Co.

Filtration Plants
* Cochrane Corp'n
* Graver Corp'n
International Filter Co.
* Permutit Co.
Reisert Automatic Water Purifying Co.
* Scaife, Wm. B. & Sons Co.

Fire Brick, Fire Hydrants, etc.
(See Brick, Hydrants, Fire, etc.)

Fittings, Ammonia
* Crane Co.
* De La Vergne Machine Co.
* Frick Co. (Inc.)
* Vilter Mfg. Co.
* Vogt, Henry Machine Co.

Fittings, Compression
* Bowser, S. F. & Co. (Inc.)
Lunkenheimer Co.

Fittings, Flanged
* Builders Iron Foundry
* Central Foundry Co.
* Crane Co.
* Edward Valve & Mfg. Co.
Kennedy Valve Mfg. Co.
Lunkenheimer Co.
* Pittsburgh Valve, Fdry. & Const. Co.
* Reading Steel Casting Co. (Inc.)
(Reading Valve & Fittings Div.)
* U. S. Cast Iron Pipe & Fdry. Co.
* Vogt, Henry Machine Co.

Fittings, Hydraulic
* Crane Co.
* Pittsburgh Valve, Fdry. & Const. Co.
* Reading Steel Casting Co., (Inc.)
(Readings Valve & Fittings Div.)
* Vogt, Henry Machine Co.

Fittings, Pipe
* Barco Mfg. Co.
Bethlehem Shipbldg.Corp'n(Ltd.)
* Central Foundry Co.
* Crane Co.
Kennedy Valve Mfg. Co.
Lunkenheimer Co.
* Pittsburgh Valve, Fdry. & Const. Co.
* Reading Steel Casting Co. (Inc.)
(Reading Valve & Fittings Div.)
Steere Engineering Co.
* Vogt, Henry Machine Co.

Fittings, Steel
* Crane Co.
* Edward Valve & Mfg. Co.
Lunkenheimer Co.
* Pittsburgh Valve, Fdry. & Const. Co.
* Reading Steel Casting Co. (Inc.)
(Reading Valve & Fittings Div.)
Steere Engineering Co.
* Vogt, Henry Machine Co.

Flanges
* American Spiral Pipe Works
* Crane Co.
* Edward Valve & Mfg. Co.
Kennedy Valve Mfg. Co.
Lunkenheimer Co.
* Pittsburgh Valve, Fdry. & Const. Co.
* Reading Steel Casting Co. (Inc.)
(Reading Valve & Fittings Div.)
* Vogt, Henry Machine Co.

Flanges, Forged Steel
* American Spiral Pipe Wks
Cann & Saul Steel Co.

Floor Armor
* Irving Iron Works Co.

Floor Stands
* Chapman Valve Mfg. Co.
* Crane Co.
Hill Clutch Mach. & Fdry. Co.
* Jones, W. A. Fdry. & Mach. Co.
Kennedy Valve Mfg. Co.
Lunkenheimer Co.
* Pittsburgh Valve, Fdry. & Const. Co.
* Reading Steel Casting Co. (Inc.)
(Pratt & Cady Division)
* Royersford Fdry. & Mach. Co.
* Schutte & Koerting Co.
* Wood's, T. B. Sons Co.

Flooring-Grating
* Irving Iron Works Co.

Flooring, Metallic
* Irving Iron Works Co.

Flooring, Rubber
* United States Rubber Co

Flour Milling Machinery
* Allis-Chalmers Mfg. Co.

Flue Gas Analysis Apparatus
* Tagliabue, C. J. Mfg. Co.

Fly Wheels
Hill Clutch Machine & Fdry. Co.
* Medart Co.
* Nordberg Mfg. Co.
* Wood's, T. B. Sons Co.

Forgings, Drop
* Vogt, Henry Machine Co.

Forgings, Hammered
Cann & Saul Steel Co.

Forgings, Iron and Steel
Cann & Saul Steel Co.

Foundry Equipment
* Whiting Corp'n

Friction Clutches, Hoists, etc.
(See Clutches, Hoists, etc., Friction)

Friction, Paper and Iron
Link-Belt Co.

Fuel Economizers
(See Economizers, Fuel)

Furnace Construction
Furnace Engineering Co.

Furnaces, Annealing and Tempering
* Combustion Engineering Corp'n
* General Electric Co.
* Whiting Corp'n

Furnaces, Boiler
* American Engineering Co.
* American Spiral Pipe Wks.
* Babcock & Wilcox Co.
* Bernitz Furnace Appliance Co.
* Combustion Engineering Corp'n
* Detroit Stoker Co.
* Riley, Sanford Stoker Co.

Furnaces, Down Draft
* O'Brien, John Boiler Works Co.

Furnaces, Electric
Detroit Electric Furnace Co.
* Westinghouse Elect. & Mfg. Co.

Furnaces, Heat Treating
* Combustion Engineering Corp'n
* General Electric Co.

Furnaces, Melting
* Combustion Engineering Corp'n
Detroit Electric Furnace Co.
* General Electric Co.
* Whiting Corp'n

Furnace, Non-Ferrous
* Combustion Engineering Corp'n
Detroit Electric Furnace Co.

Furnaces, Powdered Coal
* Combustion Engineering Corp'n
Grindle Fuel Equipment Co.

Furnaces, Smokeless
* American Engineering Co.
* Babcock & Wilcox Co.
* Combustion Engineering Corp'n
* Detroit Stoker Co.
* Riley, Sanford Stoker Co.

Fuses
* General Electric Co.
Johns-Manville (Inc.)
* Westinghouse Elect. & Mfg. Co.

Gage Boards
* American Schaeffer & Budenberg Corp'n
* Ashton Valve Co.
* Crosby Steam Gage & Valve Co.

Gage Glasses
* American Schaeffer & Budenberg Corp'n

Gage Glasses, Inclined
Sesure Water Gauge Co.

Gage Testers
* American Schaeffer & Budenberg Corp'n
* Ashton Valve Co.
* Crosby Steam Gage & Valve Co.

Gages, Altitudes
* American Schaeffer & Budenberg Corp'n
* Ashton Valve Co.
* Crosby Steam Gage & Valve Co.

Gages, Ammonia
* American Schaeffer & Budenberg Corp'n
* Ashton Valve Co.
* Crosby Steam Gage & Valve Co.
* Vogt, Henry Machine Co.

Gages, Differential Pressure
* American Schaeffer & Budenberg Corp'n
Bacharach Industrial Instrument Co.
* Bailey Meter Co.
* Tagliabue, C. J. Mfg. Co.

Gages, Draft
* American Schaeffer & Budenberg Corp'n
* Ashton Valve Co.
Bacharach Industrial Instrument Co.
* Bailey Meter Co.
* Bristol Co.
* Tagliabue, C. J. Mfg. Co.

Gages, Hydraulic
* American Schaeffer & Budenberg Corp'n
* Ashton Valve Co.
* Crosby Steam Gage & Valve Co.

Gages, Liquid Level
* Bristol Co.
Lunkenheimer Co.
* Simplex Valve & Meter Co.

Gages, Loss of Head
* Builders Iron Foundry
* Simplex Valve & Meter Co.

Gages, Measuring (Surface, Depth Dial, etc.)
* Norma-Hoffmann Bearings Corp'n

Gages, Pressure
* American Schaeffer & Budenberg Corp'n
* Ashton Valve Co.
Bacharach Industrial Instrument Co.
* Bailey Meter Co.
* Bristol Co.
* Crosby Steam Gage & Valve Co.
* Tagliabue, C. J. Mfg. Co.

Gages, Rate of Flow
Bacharach Industrial Instrument Co.
* Bailey Meter Co.
* Builders Iron Foundry
* Simplex Valve & Meter Co.

Gages, Syphon
* Tagliabue, C. J. Mfg. Co.

Gages, Vacuum
* American Schaeffer & Budenberg Corp'n
* Ashton Valve Co.
Bacharach Industrial Instrument Co.
* Bristol Co.
* Crosby Steam Gage & Valve Co.
* Tagliabue, C. J. Mfg. Co.

Gages, Water
* American Schaeffer & Budenberg Corp'n
* Ashton Valve Co.
* Bristol Co.
* Crane Co.
* Jenkins Bros.
Lunkenheimer Co.
* Reading Steel Casting Co. (Inc.)
(Pratt & Cady Division)
* Simplex Valve & Meter Co.

Gages, Water Level
* American Schaeffer & Budenberg Corp'n
* Bristol Co.
Lunkenheimer Co.
* Simplex Valve & Meter Co

Gas Plant Machinery
* Cole, R. D. Mfg. Co.
Steere Engineering Co.

Gaskets
Garlock Packing Co.
* Jenkins Bros.
Johns-Manville (Inc.)
* Sarco Co. (Inc.)

Gaskets, Iron, Corrugated
Smooth-On Mfg. Co.

Gaskets, Rubber
Garlock Packing Co.
* Goodrich, B. F. Rubber Co.
* United States Rubber Co.

Gates, Blast
* American Blower Co.
Steere Engineering Co.

Gates, Cut-off
Easton Car & Construction Co.
Link-Belt Co.

Gates, Sluice
* Chapman Valve Mfg. Co.
* Pittsburgh Valve, Fdry. & Cons. Co.

Gear Blanks
Cann & Saul Steel Co.

Gear Cutting Machines
* Jones, W. A. Fdry. & Mach. Co.

Gear Hobbing Machines
* Jones, W. A. Fdry. & Mach. Co.

*Catalogue data of firms marked * appear in the A.S.M.E. Condensed Catalogues of Mechanical Equipment, 1923-24 Volume*

FORGING

Safety Code. Tentative Safety Code of Forging. Forging—Stamping—Heat Treating, vol. 10, no. 8, Aug. 1924, pp. 282–285. Tentative draft formulated under joint sponsorship of Nat. Safety Council and Am. Drop Forging Inst. Reprinted from Nat. Safety News, June 1924.

FOUNDRIES

Economy in. Economy in Foundry Practice, E. H. Browne. Foundry Trade Jl., vol. 30, no. 412, July 10, 1924, pp. 38–40. Discusses monotony in foundry practice, case of patternmaker, management, layout of foundry, equipment, care of plant, provision of molding tools, design, patterns, molding and melting.

Exposition. The International Foundry Trades Exhibition at Birmingham. Engineering, vol. 117, no. 3052, June 27, 1924, pp. 824–825, 3 figs. At Birmingham, England, covering entire range of foundry work, especially molding machines, several of which are illustrated and described.

German Practice. German Foundry Practice, Werner. Metal Industry (Lond.), vol. 25, no. 2, July 11, 1924, pp. 38 and 43. Shurmann cupola; comparison of Shurmann with standard cupola; pearlitic cast iron; annealing cast iron; utilizing bad metal. Abridged report of paper and discussion at Int. Foundry Trades Exhibition, Eng.

Power-Gas Consumption Measurement. The Measurement of Power Gas, F. J. Taylor. Foundry Trade Jl., vol. 29, no. 390, Feb. 7, 1924, pp. 105–109, 9 figs. Measurement of amount of gas used for motive power in foundries. Discusses determination of volume passing through gas main by: (1) Estimation in case of engines, (2) pitot tubes, (3) orifices, (4) venturi tubes, and (5) electroflow meters.

Ship. Foundries on Our Men of War, A. M. Charlton. Foundry, vol. 52, no. 15, Aug. 1, 1924, pp. 584–588, 5 figs. Severe demands placed on battleships in time of war together with long periods ships remain away from home ports necessitate complete foundry and machine-shop equipment aboard.

FREIGHT HANDLING

Transhipment. Handling Transhipments at Crewe, L. M. S. Ry. Gaz., vol. 41, no. 2, July 11, 1924, pp. 44–48, 11 figs. About 24,000 packages are unloaded, sorted, and reloaded every 18 hr. at Crewe transhipshed, enabling approximately 85 per cent of traffic to be reloaded direct to destination, and effecting considerable saving in car use. Describes layout and arrangement of transhipshed.

FUELS

See OIL FUEL; PEAT; PULVERIZED COAL.

FURNACES

Heat Transfer Caused by Radiation of Gases. Heat Transfer in Furnaces as Caused by Radiation of Gases. Fuels & Furnaces, vol. 2, no. 7, July 1924, pp. 675–678, 2 figs. Equations presented which more or less upset modern theory of heat transfer and reëstablish truth of older theories.

Radiation of Gases in. Radiation of Flue Gases and Its Practical Calculation (Ueber die Bestimmung der wahren Temperatur undurchsichtiger diffus reflektierender Körper), M. Pirani. Zeit. für Technische Physik, vol. 5, no. 6, 1924, pp. 266–267. Shows that radiation increases with temperature approximately according to Planck's law of radiation and gives method for its calculation.

Recuperator. The Chapman-Stein Recuperator, W. C. Buell, Jr. Iron & Steel Engr., vol. 1, no. 6, June 1924, pp. 327–332 and (discussion) 333–339, 12 figs. Describes number of installations in use of this type which is said to have best succeeded in eliminating two main troubles, leakage and breakage.

G

GALVANIZING

Wire. Galvanizing (Étude sur la Galvanisation), A. Knepper. Usine, vol. 33, no. 24, June 14, 1924, pp. 19–23, 2 figs. Discusses thickness of zinc coat for hot galvanizing and exposure to weather; hot galvanizing and interior use; electrolytic galvanizing and exposure to weather; and electrolytic galvanizing for interior use; Develops formulas for calculation.

GAS ENGINES

Germany. Large Gas Engines in German Power Economy, P. R. Meyer. Engineering, vol. 118, no. 3055, July 18, 1924, pp. 105–106, 2 figs. Types of two- and four-cycle gas engines used; total output and capacity; waste-heat recuperation; pressure hot cooling and evaporation cooling; financial economy of gas engines; fields of application. Paper, abridged, contributed to World Power Conference.

Steel Works. The Gas Engine in the Steel Industry, A. C. Danks. Mech. Eng., vol. 46, no. 8, Aug. 1924, pp. 450–460 and (discussion) 460–462 and 501, 22 figs. First 4-cycle installation; methods of governing; effect of entering temperatures of gas and air; piston troubles and design; operating costs; engine tests, etc.

GAS PRODUCERS

Large-Scale Power Generation, Application to. The Gas Producer as Applied to Large-Scale Power Generation, A. H. Lymn. Iron & Coal Trades Rev., vol. 109, no. 2941, July 11, 1924, pp. 58–59. Describes various methods of applying gas-producer plants to generation of power on large scale and shows economies of different systems as compared with each other and with most modern direct-fired steam practice. Abstract of paper read before World Power Conference.

Pressure. Control of Pressure Gas Producers, W. P. Chandler, Jr. Iron & Steel Engr., vol. 1, no. 6, June 1924, pp. 289–293 and (discussion) 293–299, 4 figs. For metallurgical furnaces in steel mills; discusses main factors influencing producer operation and means for obtaining greatest return for given sizes of gas producer and from coal charged.

GEARS

Friction. Fieux System of Friction Gearing and Its Application to Railway Motor Cars as Automatic Gearing [Le conjoncteur-disjoncteur à friction (Systéme Fieux), son application aux véhicules automoteurs comme embrayage automatique], J. Fieux. Société d'Encouragement pour l'Industrie Nationale—Bul., vol. 136, no. 3, Mar. 1924, pp. 279–287, 8 figs. Properties and action of Fieux make-and-break friction gear, and examples of application to railway motor cars.

Transmission by Means of Friction Wheels (Les transmissions par galets de friction). Génie Civil, vol. 84, no. 23, June 7, 1924, pp. 549–551, 6 figs. Use of friction wheels and disks; transmission efficiency; coefficient of friction; etc.

GRINDING

Automobile Parts. Reo Parts Ground Accurately, F. B. Jacobs. Abrasive Industry, vol. 5, nos. 7 and 8, July and Aug. 1924, pp. 163–167 and 193–197, 19 figs. Grinding methods at plant of Reo Motor Co., Lansing, Mich. Each manufacturing department has its own grinding equipment. Automatic machines used extensively for finishing various units.

Machine-Tool Parts. Grinding Operations Expedite Manufacture of Machine Tools, W. E. Groene. Abrasive Industry, vol. 5, no. 8, Aug. 1924, pp. 189–192, 6 figs. Describes grinding operations carried on at plant of R. K. LeBlond Machine Tool Co., Cincinnati.

GRINDING MACHINES

Interal and External. Internal and External Grinding Machines. Machy. (Lond.), vol. 24, no. 617, July 24, 1924, pp. 521–526, 8 figs. Designed by Holroyd & Co., Ltd., Milnrow, for grinding large steel tubes.

GUNS

Erosion of. Improvements in Gun-Construction and Allied Problems, T. Tanimura. Faculty of Eng., Tokyo Imperial Univ.—Jl., vol. 13, no. 4, Mar. 1923, pp. 103–175, 10 figs. Concludes that as gun erosion cannot be remedied at present, gun construction rendering relining easy should be studied; inner surface of bore of relined guns is always subjected to stress beyond elastic limit; proposes improved construction on these lines.

GYROSCOPES

Theory. Some Properties of Spherical Curves, with Applications to the Gyroscope, O. D. Kellogg. Am. Mathematical Soc.—Trans., vol. 25, no. 4, Oct. 1923, pp. 501–524, 2 figs. Discusses certain intrinsic properties of spherical curves and applies results to theory of gyroscope; gives further results and formulas in connection with gyroscope problems.

H

HANGARS

Omaha, Neb., Collapse. Omaha Aerial Mail Hangar Wrecked by Gale, R. M. Brown. Eng. News Rec., vol. 93, no. 5, July 31, 1924, pp. 180–182, 3 figs. Violent gale crushed in end wall and twisted out of position roof trusses of a large steel-framed airplane hangar. Circumstances of wreck and design of structure.

HARDNESS

Aluminum Bronze, Heat-Treated. Notes on the Hardness of Heat-treated Aluminum Bronze, G. F. Comstock. Am. Inst. Min. & Met. Engrs.—Trans., Advance paper No. 1357–N, July 1924, 9 pp., 4 figs. Results of scleroscope and Brinell tests on specimens of cast 10 per cent aluminum bronze, quenched and reheated at various low temperatures.

Gray Iron, Brinell Test. The Value of the Brinell Hardness Test to the Gray-Iron Foundry, I. Jaederstroem. Testing, vol. 1, no. 4, Apr. 1924, pp. 286–289, 2 figs. Results of researches. Main reason for great popularity of Brinell test in investigation of steel is fact that it not only indicates resistance of material to penetration of another, harder body, but that hardness values thus obtained permit also definite conclusions on tensile strength of steel under investigation.

HEATING

Buildings. The Calculation of Thermal Requirements in Buildings by Means of a Graphic Chart, J. N. Victor. Am. Architect, vol. 126, no. 2450, July 16, 1924, pp. 69–71. Chart is adapted to designing of steam, vapor, vacuum and hot-water systems which employ direct, indirect or coil radiation and for all temperature differences.

HEATING, HOT-WATER

Pipe Calculation. Calculation of Pipes for Hot-Water Heating (Rohrbemessung für Warmwasserheizungen. Vergleichende Betrachtungen der verschiedenen Rechnungsweisen), H. Behrens. Gesundheits-Ingenieur, vol. 47, nos. 27 and 28, July 5 and 12, 1924, pp. 285–290 and 297–303, 13 figs. Compares various methods of calculation and finds Brabbée's best; applies Brabbée's figures in construction of tables for rapid calculation of sizes.

HYDRAULIC PRESSES

Ram Speed. Ram Speed of Hydraulic Presses, H. S. Cattermole. Mech. Wld., vol. 76, no. 1959, July 18, 1924, p. 37. Discusses required ram speed for given operation, shows relation between press and pump and press and accumulator, and makes calculations.

HYDRAULIC TURBINES

Acceptance Test. Proposal for Uniform Rules for Testing Water-Power Plants, G. Sundby. Engineering, vol. 118, no. 3056, July 25, 1924, pp. 145–147. Discusses diversity in specifications and guarantee tests, and various factors to be considered in formulation of standard tests. Abstract of paper read before World Power Conference.

Calculation. Blade Wheels Operating in a Free Stream (Im offenen Flüssigkeitsstrom arbetende Flügelräder), E. Moeller. Zeit. des Vereines deutscher Ingenieure, vol. 68, no. 26, June 28, 1924, pp. 675–680, 6 figs. Analytical treatment of helical-turbine theory for finite number of blades and its application.

Pelton Wheels. Pelton Wheels Working at Variable Heads (Au sujet des turbines Pelton travaillant sous une hauteur de chute variable), M. deSparre. Académie des Sciences-Comptes rendus des Séances, vol. 178, no. 24, June 10, 1924, pp. 1942–1948. Mathematical determination of head H_0 serving as basis for calculation, so as to make variation of efficiency minimum when head varies between minimum H_1 and maximum H_2.

Reaction. The Hydraulic Reaction Turbine, H. B. Taylor. Engineering, vol. 118, no. 3054, July 11, 1924, pp. 71–73. Discusses recent improvements including, (1) incorporation of turbine as integral part in power-house construction, (2) division of casing into number of radial sections separated by planes containing turbine axis, (3) adoption of propeller-type turbine of extremely high specific speed, (4) transformation of draft tube, etc. Abstract of paper read before World Power Conference.

HYDROELECTRIC DEVELOPMENTS

Canada. Queenston-Chippawa Power Development, F. A. Gaby. Can. Engr., vol. 47, no. 6, Aug. 5, 1924, pp. 209–215, 6 figs. Outstanding features of Ontario Hydroelectric Power Commission's development reviewed in paper presented at World Power Conference; will ultimately have capacity of over 550,000 hp.

France. Putting Through a Great Hydro-Electric Project in France. Compressed Air Mag., vol. 29, no. 7, July 1924, pp. 919–922, 13 figs. Details of work carried out in Ossau Valley, Pyrenees, for supplying power for electrification of Midi Ry., including reservoir and tunnel work, power-house construction, and equipment.

India. Sutlej River Hydro-Electric Scheme, A. C. deL. Joly de Lotbinière. Roy. Engrs. Jl., vol. 38, no. 2, June 1924, pp. 267–270. Summary of preliminary survey report; available head, 328 ft.; 10-ft. pressure piping, 1.8 miles in length for turbines.

Newfoundland. Hydro-Electric Power Development in Newfoundland. Engineering, vol. 118, no. 3056, July 25, 1924, pp. 125–127, 15 figs. partly on supp. plates. Particulars of hydroelectric scheme being carried out in Humber River district of Newfoundland, where continuous output of 100,000 b.hp. will be utilized in paper mills of Newfoundland Power & Paper Co., Ltd., and for lighting and heating new township of Corner Brook. Work is being carried out by W. G. Armstrong, Whitworth & Co., Ltd., Lond., who are also manufacturing turbines which will be installed at the site.

Skagit River, Washington. Skagit River Hydro-Electric Development, S. G. Roberts. Compressed Air Mag., vol. 29, no. 8, Aug. 1924, pp. 949–954, 18 figs. Project now delivers 55,000 hp. to Seattle and may ultimately produce more than half million hp. for whole of western Washington.

Tasmania. A Few Notes on the Hydro-Electric Power of Tasmania, C. C. Halkyard. Australasian Inst. Min. & Met.—Proc., no. 52, Dec. 31, 1923, pp. 241–258, 9 figs. Water-power potentialities, application of power commercially, details of Waddaman power plant and main works, canals, pipe lines, transmission lines, substation, etc.

HYDROELECTRIC PLANTS

Alabama. Hydroelectric Practises and Equipment of the South, O. G. Thurlow and J. A. Sirnit. Am. Inst. Elec. Engrs.—Jl., vol. 43, no. 8, Aug. 1924, pp. 719–723, 8 figs. Discusses hydraulic power resources of South, design of Alabama Power Co.'s plants, Southern superpower system and advantages of linking up systems.

Canada. Building Canada's Hydro Electric Power Units, H. P. Armson. Can. Machy., vol. 32, no. 31, July 31, 1924, pp. 19–22, 5 figs. Outline of water-power development in Dominion with details of the contructions features of plant on Isle Maligne and shop methods which are used in building some units at Canadian Allis-Chalmers Co's. Davenport plant in Toronto.

France. The Chancy-Pougny Hydroelectric Plant on the Upper Rhône (L'usine hydro-électrique de Chancy-Pougny sur le Haut-Rhône), C. Dantin. Génie Civil, vol. 85, no. 1, July 5, 1924, pp. 1–10, 13 figs. on supp. plate. Describes new hydroelectric plant about to be put in operation at Swiss frontier, general layout, barrage arrangement, concrete work; two of the five turbo-alternators to be running in November.

Ice Troubles. Ice Troubles in Norwegian Water-Power Plants, A. Ruths. Engineering, vol. 118, no. 3054, July 11, 1924, pp. 73–74. Details of power-house troubles due to frazil ice and drift ice and their elimination. Abstract of paper read before World Power Conference.

Manufactured by Advertisers — CLASSIFIED LIST OF MECHANICAL EQUIPMENT — Alphabetical List on page 156

Gears, Bakelite
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*Catalogue data of firms marked * appear in the A.S.M.E. Condensed Catalogues of Mechanical Equipment, 1923-24 Volume*

I

ICE PLANTS

Freezing Tanks. Ice Freezing Tank Design, C. Wilkie. Ice & Refrigeration, vol. 67, no. 1, July 1924, pp. 50–55, 13 figs. Points out ways whereby installation of freezing tanks can be safeguarded against errors; influence of harvesting equipment. Paper read before meeting of Chicago subordinate N. A. P. R. E. and Chicago Sec. A. S. R. E.

Oil-Engine-Driven. Economy from Oil Engine Power at the Coal Pit's Mouth. Oil Engine Power, vol. 2, no. 7, July 1924, pp. 363–365, 5 figs. Operating at mouth of coal mine and driving Marion County Coal Co.'s, Centralia, Ill., own machinery, three oil engines have been able to produce substantial savings over and above cost of coal-generated power in production of ice and refrigeration.

IMPACT TESTING

Rounded Bars. Experiments on the Duration of Impacts, Mainly of Bars with Rounded Ends, in Elucidation of the Elastic Theory, J. E. P. Wagstaff. Lond., Edinburgh & Dublin Philosophical Mag. & Jl. of Sci., vol. 48, no. 283, July 1924, pp. 147–158, 2 figs. Discusses duration of collision of two perfectly elastic bars and its form of mathematical relation.

INDUSTRIAL MANAGEMENT

Bonus Systems. See BONUS SYSTEMS.

Budgeting. Elements of Budget Control, D. J. Hutchinson. Pit & Quarry, vol. 8, no. 10, July 1924, pp. 75–78. Procedure in establishing budget system.

Order System. Central Office and Branch Yard Millwork Order System, T. C. Herrington. Wood-Worker, vol. 43, no. 5, July 1924, pp. 42–44, 4 figs. Describes effective but simple millwork order, billing, and scheduling system, which has been developed and is being used by large lumber and millwork concern operating one main plant and four branch yards in Detroit, Mich.

Rate Setting. Rate Fixing in Engineering Works. Machy. (Lond.), vol. 24, no. 617, July 24, 1924, pp. 516–518, 2 figs. Payment by results and rate-fixing methods; share of production responsibilities by management and labor.

INDUSTRIAL RELATIONS

Labor Management. What We Think of Industrial Democracy After 7 Years, W. P. Hapgood. Factory, vol. 33, no. 2, Aug. 1924, pp. 187–189 and 286–290, 2 figs. Experiences of factory council in working its way up through usual worries about wages and hours of work into constructive effort toward bringing business to higher level of efficiency.

INTERNAL-COMBUSTION ENGINES

Air Supply. A Note on the Air Supply for Large Motor Ships, P. T. Brown. Inst. Mar. Engrs.—Trans., vol. 36, July 1924, pp. 101–140, 11 figs. Discusses air requirements of Diesel machinery for injecting and pulverizing fuel, and for maneuvring engines and other purposes; Lloyd's rules; air compressors and their size.

British Empire Exhibition. Internal-Combustion Engines at the British Empire Exposition, J. B. C. Kershaw. Power, vol. 60, no. 5, July 29, 1924, pp. 168–170, 6 figs. Describes different types exhibited.

[See also AIRPLANE ENGINES; AUTOMOBILE ENGINES; DIESEL ENGINES; GAS ENGINES; OIL ENGINES.]

IRON ALLOYS

Casting. Casting Properties of Iron and Metal Alloys (Giessereieigenschaften der Eisen- und Metall-Legierungen), E. Toussaint. Praktische Maschinen-Konstrukteur, vol. 57, no. 21, June 10, 1924, pp. 295–298, 13 figs. Discusses changes in volume during cooling, increase due to separation of graphite, etc.

Chromium-Iron. Some Engineering Applications of High-Chromium-Iron Alloys, C. E. MacQuigg. Am. Soc. for Testing Matls., Preprint of paper presented at meeting June 24–27, 1924, No. 19j, 10 pp., 6 figs. Uses and limitations of an alloy with about 25 to 30 per cent of chromium and fractions of one per cent of silicon and manganese, remainder largely iron; carbon varies from about 0.1 to 3 per cent, depending on properties desired.

Iron-Carbon. A Laboratory Method for the Preparation of Small Steel Bars Differing Only in Carbon Content and the Effect of Changes in Carbide Concentration on the Specific Resistance, E. D. Campbell and G. W. Whitney. Am. Soc. for Steel Treating—Trans., vol. 6, no. 1, July 1924, pp. 33–50. Results of laboratory tests by means of which small steel bars varying only in carbon content may be prepared; also specific resistance measurements on these bars when annealed and when hardened by quenching in oil or in water.

Iron-Nickel. Hardness of Iron-Nickel Alloys (Die Härte von Eisen-Nickel-Legierungen), H. Schottky. Zeit. für anorganische u. allgemeine Chemie, vol. 133, no. 1, Feb. 11, 1924, pp. 26–28. Maximum hardness of iron-nickel alloys depends on co-existence of two solid solutions, viz., α-iron in α-nickel and γ-iron in α-nickel.

IRON CASTINGS

Cleaning. Cleaning Iron Castings Hydraulically. Mech. Wld., vol. 75, no. 1955, June 20, 1924, pp. 389–390. Describes new method of cleaning castings, successfully experimented with at Erie, Pa., foundry of Gen. Elec. Co.; results in considerable saving of labor and time and eliminates dust. Abstract of paper read by C. B. Lockhart before Pittsburgh Foundrymen's Assn.

Titanium Additions, Effect of. Some Experiments as to the Effect of Titanium in Iron Castings (Einige Versuche über den Einfluss eines Titanzusatzes zum Rohguss auf den metallurgischen Verlauf des Temperprozesses), E. Piwowarsky. Stahl u. Eisen, vol. 44, no. 26, June 26, 1924, pp. 745–748, 7 figs. Results show that titanium favors formation of fine structure; effects more rapid decomposition of carbide and gasification of carbon.

IRON AND STEEL

Corrosion. The Submerged Corrosion of Iron, W. G. Whitman and R. P. Russell. Chem. & Industry, vol. 43, nos. 26 and 27, June 27, July 4, 1924, pp. 193T-196T and 197T-199T, 4 figs. Discusses corrosion under natural water and solutions of alkali and non-oxidizing acids and its explanation along electrochemical lines.

Effect of Temperature on. Effect of Temperature on Metals. Power Plant Eng., vol. 28, no. 15, Aug. 1, 1924, pp. 801–803, 3 figs. Review of data on irons and steels. Presented before joint meeting of A.S.M.E. and A.S.T.M.

LABOR

Hours of Work. Effect of Changes in Hours of Work on Output. Monthly Labor Rev., vol. 19, no. 1, July 1924, pp. 120–124. Discusses 8-hr. day entirely from economic standpoint and analyzes existing data on relation between hours of work and production, showing complexity of problem.

Railway, Germany. Labor Problem of the German State Railroads. Monthly Labor Rev., vol. 19, no. 1, July 1924, pp. 47–54. Discusses reasons for change from large surplus to huge deficit of railways, including increase in payroll and cost of materials, deteriorated railway conditions, diminished labor efficiency, faulty employment policy, etc. Abstract taken from Jl. Political Economy.

L

LABORATORIES

National Physical Laboratory, England. The National Physical Laboratory. Engineering, vol. 117, no. 3052, and vol. 118, nos. 3053 and 3055, June 27, July 4 and 18, 1924, pp. 823–824, 5–6 and 100–101, 1 fig. Review of work done by the Laboratory during 1923, including work of engineering and aerodynamics departments, work on metallurgy, physics, electrical standards and measurements, wireless, electrotechnics, cables, and photometry.

LATHES

Inspection of Parts. The Inspection System in a Lathe Building Plant, H. S. Riggs. Machy. (Lond.), vol. 24, no. 616, July 17, 1924, pp. 481–486, 12 figs. Checking accuracy of lathe parts, assembled units and completed machines of Lodge & Shipley Machine Tool Co.

LIGHTING

Roundhouse. Roundhouse Lighting on the Elgin, Joliet & Eastern, A. W. Ryan. Ry. Elec. Engr., vol. 15, no. 7, July 1924, pp. 222–224, 6 figs. All conduits for lighting placed in concrete pillars or floor; single lead-covered conductor for welding distribution.

LIQUIDS

Evaporation. The Rate of Evaporation of Liquids in a Current of Air, T. B. Hine. Physical Rev., vol. 24, no. 1, July 1924, pp. 79–91, 1 fig. Results of experiments show that rate of evaporation is linear function of wind velocity.

Heat of Evaporation. Apparatus for the Determination of the Heat of Evaporation of Liquids of High Boiling Points, J. H. Awbery and E. Griffiths. Physical Soc. of Lond.—Proc., vol. 36, part 4, June 15, 1924, pp. 303–312, 2 figs. Discusses two new forms of apparatus and their relative merits; tested by determining with them heats of evaporation of alcohol, water, and aniline.

LOCOMOTIVE BOILERS

Fireboxes. Four-Sheet Fireboxes for Mallet Locomotives. Ry. Rev., vol. 75, no. 5, Aug. 2, 1924, pp. 161–165, 9 figs. Describes firebox construction on Norfolk & Western Ry.; Seven-sheet firebox construction reduced to four by use of unusually large boiler plates.

Saving Time in Laying Out Locomotive Boilers, C. A. Chincholl. Boiler Maker, vol. 24, no. 7, July 1924, pp. 196–197, 4 figs. Simplified methods of developing wrapper sheets and heads for narrow- and wide-type locomotive fireboxes.

Repairing. Repairing Locomotive Boilers at Bischheim, France. Boiler Maker, vol. 24, nos. 6 and 7, June and July 1924, pp. 157–160 and 198–200 and 219, 10 figs. Special equipment developed at new Alsace and Lorraine "Railways" boiler shop to speed up production, including equipment for erecting and testing locomotive boilers and for flue reclaiming. Translated from Revue Générale des Chemins de Fer et des Tramways.

Side Lights on Boiler Work at Glenwood Shops. Boiler Maker, vol. 24, no. 7, July 1924, pp. 191–194, 10 figs. Special shop made equipment aids in repairing many different classes of locomotives coming to Glenwood shops, Baltimore & Ohio Ry.

LOCOMOTIVES

Algerian State Railways. New Locomotives for the Algerian State Railways. Ry. Gaz., vol. 41, no. 1, July 4, 1924, pp. 13–15, 6 figs. 4–8–2 "Mountain" type locomotives designed and built by Schneider & Co., designed to haul trains of 300 tons on gradients of 1 in 70 and 1 in 80 at 31 m.p.h.; for heavy service in passenger and freight traffic.

Boilers. See LOCOMOTIVE BOILERS.

Consolidation. Reading Company Consolidation Locomotives. Ry. Rev., vol. 75, no. 2, July 12, 1924, pp. 43–46, 3 figs. Particulars of new 2–8–0 locomotives placed in service by Phila. & Reading Ry. for handling coal trains. Tractive effort 71,000 lb.

Development. The Steam Locomotive; Engineering and Business Considerations, W. H. Winterrowd. Can. Ry. & Mar. Wld., no. 317, July 1924, pp. 322–325, 3 figs. Discusses development steam locomotive has undergone during past 20 years and lines along which future development may be expected.

Electric. See ELECTRIC LOCOMOTIVES.

4-8-0. 4–8–0 Type Locomotive for the Buenos Ayres Great Southern Railway. Ry. Engr., vol. 45, no. 535, Aug. 1924, p. 291, 1 fig. Also Ry. Gaz., vol. 41, no. 4, July 25, 1924, p. 119. Engine built by W. G. Armstrong, Whitworth & Co., Ltd. for Buenos Ayres Gt. Southern Ry. is oil-burning type having three single-expansion cylinders and 4–8–0 wheel arrangement.

4-6-0. New 4–6–0 Mixed-Traffic Locomotive, Great Southern & Western Railway, Ireland. Ry. Gaz., vol. 41, no. 5, Aug. 1, 1924, pp. 148–150, 4 figs. Tests made with first of these engines show that, although primarily built for handling goods traffic, class will also be useful for working fast passenger trains, thus ranking them as mixed-traffic locomotives.

French Railways. New Locomotives for French Railways. Ry. Gaz., vol. 40, no. 26, June 27, 1924, pp. 923–925, 5 figs. Describes new 4–6–2 type four-cylinder engine for Calais-Paris express passenger service of Northern Ry. and 2–8–2 type tank engine equipped with condensing apparatus for Paris-Orleans Ry.

Long Runs. Extension of Locomotive Runs, F. E. Russel. Ry. Mech. Engr., vol. 98, no. 8, Aug. 1924, pp. 464–467. Discusses advantages of long runs and mechanical difficulties encountered. Abstract of paper read before Pac. Ry. Club.

Mallet. Baldwin Mallet Locomotive for India. Ry. Gaz., vol. 41, no. 5, Aug. 1, 1924, pp. 154–155, 2 figs. Baldwin Locomotive Works recently delivered to North-Western Ry., India, powerful Mallet locomotive developing tractive force of 52,600 lb. at 85 per cent boiler pressure.

Oil-Electric. Oil-Electric Locomotive Comes to New York. Compressed Air Mag., vol. 29, no. 7, July 1924, pp. 923–925, 6 figs. Details of new locomotive with 200-kw. generator directly connected to 300-hp. oil engine for switching service of N. Y. Central; uses low-cost fuel oil.

Passenger. Chicago & Eastern Illinois Ry. 4–6–2 Type Locomotives. Ry. Rev., vol. 75, no. 6, Aug. 9, 1924, pp. 197–200, 3 figs. Modern heavy Pacific type locomotives handling through passenger runs; tractive effort, 43,900 lb.; steam pressure, 200 lb.

Power and Efficiency Improvements. Power and Efficiency Improvements In Steam Locomotives, G. M. Basford. Engrs. & Eng., vol. 41, nos. 3 and 6, Mar. and June 1924, pp. 61–64 and (discussion) 64–69 and 159–162, 4 figs. Paper read at Conference on Economy in the Use of Fuel, held at Engrs. Club of Phila., Jan. 15, 1924.

Rack. A New Rack Locomotive. Engineer, vol. 136, no. 3576, July 11, 1924, p. 55, 3 figs. Details of locomotive developed by Railgrip Syndicate, Ltd., Lond., Eng. A steam locomotive with an auxiliary pair of cylinders for driving a pair of wheels, having a positive grip on rails, through a set of speed-reducing gearing; auxiliary engine brought into operation only when gradient of line becomes so steep that usual driving wheels will not provide sufficient adhesion to move load.

Rod Repairs. Handling Rod Work at Battle Creek Shops, M. H. Westbrook. Ry. Mech. Engr., vol. 98, no. 7, July 1924, pp. 437–442, 18 figs. Rod repair department at Grand Trunk shops, Battle Creek, Mich., is equipped and laid out to take care of 22-pit repair shop, handling all classified repairs to 334 locomotives, including U. S. R. A. Mikado type; each man handles special work.

Steam and Electric, Comparison of. Steam and Electric Locomotives Compared. Ry. Gaz., vol. 41, no. 3, July 18, 1924, p. 90. Electric-locomotive traction enables large horsepower to be obtained from locomotives of reasonable length and with low axle loads.

Tank. Four-Cylinder "Baltic" Tank Engine—London Midland & Scottish Railway. Ry. Gaz., vol. 41, no. 3, July 18, 1924, pp. 82–83, 3 figs. 4–6–4 type four-cylinder tank engine built at Horwich works of London Midland & Scottish Ry. for use in dealing with heavy suburban traffic over severely graded lines, also for hauling express residential trains within radius of about 50 miles.

2-8-2. New 2-8-2 Type Heavy Goods Engine, Imperial Japanese Railways. Ry. Gaz., vol. 41, no. 4, July 25, 1924, p. 120, 2 figs. Engine for working heavy freight trains built by Kawasaki Dockyard & Eng. Co. at their Hiogo Works, Kobe; piston stroke, 26 in.; total engine wheelbase, 31 ft. 6 in.; steam pressure, 180 lb. per sq. in.

Valve Gears. Development of the Lentz Poppet Valve Gear, A. Niklitchek. Ry. Mech. Engr., vol. 98, no. 7, July 1924, pp. 407–409, 4 figs. Discusses reduction of valve-gear maintenance costs, and lubricant and water consumption on Austrian locomotives.

LUBRICATING OILS

Cylinder. Oils for Valve and Cylinder Lubrication, A. J. Dixon. So. Engr., vol. 41, no. 5, July 1924, pp. 60–61. Why some cylinders take polish and others do not. Selection of cylinder oils.

Purification. Purification of Marine Turbine and Diesel Engine Lubricating Oils. Am. Mar. Engr., vol. 19, no. 7, July 1924, pp. 11–13, 4 figs. In marine turbines and Diesel engines it is almost universal practice

Manufactured by Advertisers — CLASSIFIED LIST OF MECHANICAL EQUIPMENT — Alphabetical List on page 156

Instrument, Recording
* American Schaeffer & Budenberg Corp'n
* Ashton Valve Co.
Bacharach Industrial Instrument Co.
* Bailey Meter Co.
* Bristol Co.
* Builders Iron Foundry
* Crosby Steam Gage & Valve Co.
* General Electric Co.
* Tagliabue, C. J. Mfg. Co.
* Westinghouse Electric & Mfg. Co.

Instruments, Scientific
Weber, F. Co. (Inc.)

Instruments, Surveying
Dietzgen, Eugene Co.
Keuffel & Esser Co.
New York Blue Print Paper Co.
ParVell Laboratories
U. S. Blue Co.
Weber, F. Co. (Inc.)

Insulating Materials (Electrical)
* General Electric Co.
Johns-Manville (Ince.

Insulating Materials (Heat and Cold)
* Celite Products Co.
Johns-Manville (Inc.)
* King Refractories Co. (Inc.)
* Quigley Furnace Specialties Co.

Insulation, Boiler
Carey, Philip Co.
* Celite Products Co.

Insulation, Heat
Carey, Philip Co.

Joints, Expansion
Carey, Philip Co.
* Crane Co.
* Croll-Reynolds Engineering Co.
Hamilton Copper & Brass Works
Lunkenheimer Co.
* Pittsburgh Valve, Fdry. & Const. Co.
* United States Rubber Co.
* Wheeler, C. H. Mfg. Co.

Joints, Flanged Pipe
* Crane Co.
* Pittsburgh Valve, Fdry. & Const. Co.

Joints, Flexible
* Barco Mfg. Co.

Joints, Swing and Swivel
* Barco Mfg. Co.
Lunkenheimer Co.

Kettles, Steam Jacketed
* Cole, R. D. Mfg. Co.
* Nordberg Mfg. Co.
* Titusville Iron Works Co.

Keys, Machine
* Smith & Serrell
* Whitney Mfg. Co.

Keyseating Machines
* Whitney Mfg. Co.

Kilns, Dry (Brick, Lumber, Stone, etc.)
* American Blower Co.
* Sturtevant, B. F. Co.

Ladles
* Whiting Corp'n

Lamps, Incandescent
* General Electric Co.
Johns-Manville (Inc.)
* Westinghouse Electric & Mfg. Co.

Land-Clearing Machinery
Clyde Iron Works Sales Co.

Lathes, Automatic
* Jones & Lamson Machine Co.

Lathes, Brass
* Warner & Swasey Co.

Lathes, Chucking
* Jones & Lamson Machine Co.

Lathes, Engine
* Builders Iron Foundry

Lathes, Turret
* Jones & Lamson Machine Co.
* Warner & Swasey Co.

Levers, Flexible (Wire)
* Gwilliam Co.

Lifts, Lumber
Leitelt Iron Works

Lighting Equipment
* Westinghouse Elect. & Mfg. Co.

Linings, Brake
Johns-Manville (Inc.)

Linings, Furnace
* Celite Products Co.
Johns-Manville (Inc.)
* King Refractories Co. (Inc.)
* McLeod & Henry Co.
* Quigley Furnace Specialties Co.

Linings, Stack
Johns-Manville (Inc.)

Loaders, Portable
* Gifford-Wood Co.
Link-Belt Co.

Locomotives, Electric
* General Electric Co.
* Westinghouse Electric & Mfg. Co.

Locomotives, Storage Battery
* General Electric Co.
* Westinghouse Electric & Mfg. Co.

Logging Machinery
Clyde Iron Works Sales Co.
Lidgerwood Mfg. Co.

Lubricants
* Dixon, Joseph Crucible Co.
* Royersford Fdry. & Mach. Co.
Vacuum Oil Co.

Lubricating Systems
* Bowser, S. F. & Co. (Inc.)
Lunkenheimer Co.

Lubricators, Cylinder
* Bowser, S. F. & Co. (Inc.)
Lunkenheimer Co.

Lubricators, Force-Feed
* Bowser, S. F. & Co. (Inc.)
Lunkenheimer Co.

Lubricators, Hydrostatic
* Crosby Steam Gage & Valve Co.
Lunkenheimer Co.

Lubricators (Sight Feed)
* Crosby Steam Gage & Valve Co.
Lunkenheimer Co.

Machine Tool Feed Control Systems (Oil Pressure)
* American Fluid Motors Co.

Machine Work
* Brown, A. & F. Co.
* Builders Iron Foundry
Farrel Foundry & Machine Co.
* Franklin Machine Co.
Hill Clutch Machine & Fdry. Co.
Johnson, Carlyle Machine Co.
* Jones, W. A. Fdry. & Mach. Co.
Lammert & Mann Co.
Link-Belt Co.
* Nordberg Mfg. Co.

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(Is classified under the headings descriptive of character thereof)

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* American Blower Co.
Bacharach Industrial Instrument Co.
* Simplex Valve & Meter Co.

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* American Blower Co.
* Clarage Fan Co.
* Coppus Engineering Corp'n
* Green Fuel Economizer Co.
* Sturtevant, B. F. Co.

Mechanical Stokers
(See Stokers)

Metal Treating
* American Metal Treatment Co.

Metals, Perforated
* Hendrick Mfg. Co.

Meters, Air and Gas
Bacharach Industrial Instrument Co.
* Bailey Meter Co.
* Builders Iron Foundry
* General Electric Co.

Meters, Boiler Performance
* Bailey Meter Co.

Meters, Condensation
* Simplex Valve & Meter Co.

Meters, Electric
* General Electric Co.
* Westinghouse Electric & Mfg. Co.

Meters, Feed Water
* Bailey Meter Co.
* Builders Iron Foundry
* Cochrane Corp'n
* General Electric Co.
Hoppes Mfg. Co.
* Simplex Valve & Meter Co.
* Worthington Pump & Machinery Corp'n

Meters, Flow
Bacharach Industrial Instrument Co.
* Bailey Meter Co.
* Cochrane Corp'n
* General Electric Co.
* Simplex Valve & Meter Co.

Meters, Oil
* Bowser, S. F. & Co. (Inc.)
* Cochrane Corp'n
* General Electric Co.
* Simplex Valve & Meter Co.
* Worthington Pump & Machinery Corp'n

Meters, Pitot Tube
* American Blower Co.
* Simplex Valve & Meter Co.

Meters, Steam
* Bailey Meter Co.
* Builders Iron Foundry
* Cochrane Corp'n
* General Electric Co.

Meters, V-Notch
* Bailey Meter Co.
* Cochrane Corp'n
* General Electric Co.

Meters, Venturi
* Builders Iron Foundry
* National Meter Co.
* Simplex Valve & Meter Co.

Meters, Water
* Cochrane Corp'n
* General Electric Co.
Hoppes Mfg. Co.
* National Meter Co.
* Simplex Valve & Meter Co.
* Worthington Pump & Machinery Corp'n

Milling and Drilling Machines (Combined)
Universal Boring Machine Co.

Milling Machines, Hand
* Whitney Mfg. Co.

Milling Machines, Keyseat
* Whitney Mfg. Co.

Milling Machines, Plain
* Warner & Swasey Co.

Mills, Ball
* Allis-Chalmers Mfg. Co.
* Smidth, F. L. & Co.
* Worthington Pump & Machinery Corp'n

Mills, Blooming and Slabbing
Mackintosh-Hemphill Co.

Mills, Grinding
Farrel Foundry & Machine Co.
* Smidth, F. L. & Co.

Mills, Sheet and Plate
Mackintosh-Hemphill Co.

Mills, Structural, Rail and Bar
Mackintosh-Hemphill Co.

Mills, Tube
* Allis-Chalmers Mfg. Co.
* Smidth, F. L. & Co.
* Worthington Pump & Machinery Corp'n

Mining Machinery
* Allis-Chalmers Mfg. Co.
* General Electric Co.
* Ingersoll-Rand Co.
* Worthington Pump & Machinery Corp'n

Monel Metal
Driver-Harris Co.

Monorail Systems
(See Tramrail Systems, Overhead)

Motor-Generators
* Allis-Chalmers Mfg. Co.
* General Electric Co.
Ridgway Dynamo & Engine Co.
* Westinghouse Electric & Mfg. Co.

Motors, Electric
* Engberg's Electric & Mech. Wks.
* General Electric Co.
Master Electric Co.
Ridgway Dynamo & Engine Co.
* Sturtevant, B. F. Co.
* Westinghouse Electric & Mfg. Co.

Motors, Synchronous
Ridgway Dynamo & Engine Co.

Nickel, Sheet
Driver-Harris Co.

Nipple Threading Machines
* Landis Machine Co. (Inc.)

Nitrogen Gas
* Linde Air Products Co.

Nozzles, Blast
* Schutte & Koerting Co.

Nozzles, Sand and Air
Lunkenheimer Co.

Nozzles, Spray
* Cooling Tower Co. (Inc.)
* Schutte & Koerting Co.

Odometers
Veeder Mfg. Co.

Ohmeters
* General Electric Co.

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* Bowser, S. F. & Co. (Inc.)
* Crane Co.
Lunkenheimer Co.

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Oil Burning Equipment
Bethlehem Shipbldg.Corp'n(Ltd.)
* Combustion Engineering Corp'n
* Schutte & Koerting Co.

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* Bowser, S. F. & Co. (Inc.)

Oil Mill Machinery
* Worthington Pump & Machinery Corp'n

Oil Refinery Equipment
Bethlehem Shipbldg.Corp'n(Ltd.)
* Vogt, Henry Machine Co.

Oil Storage and Distributing Systems
* Bowser, S. F. & Co. (Inc.)

Oil Well Machinery
* Ingersoll-Rand Co.
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* Worthington Pump & Machinery Corp'n

Oiling Devices
* Bowser, S. F. & Co. (Inc.)
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Oiling Systems
* Bowser, S. F. & Co. (Inc.)
Lunkenheimer Co.

Oils, Lubricating
Vacuum Oil Co.

Ore Handling Machinery
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Chain Belt Co.
Link-Belt Co.

Ovens, Core
* Whiting Corporation

Oxy-Acetylene Supplies
* Linde Air Products Co.

Oxygen Gas
* Linde Air Products Co.

Packing, Ammonia
Garlock Packing Co.
France Packing Co.
* Goodrich, B. F. Rubber Co.
* United States Rubber Co.

Packing, Asbestos
Garlock Packing Co.
* Goodrich, B. F. Rubber Co.
Johns-Manville (Inc.)

Packing, Centrifugal Pump
Garlock Packing Co.

Packing, Hydraulic
France Packing Co.
Garlock Packing Co.
* Goodrich, B. F. Rubber Co.
Johns-Manville (Inc.)

Packing, Metallic
France Packing Co.
Garlock Packing Co.
Johns-Manville (Inc.)

Packing, Rod (Piston and Valve)
France Packing Co.
Garlock Packing Co.
* Goodrich, B. F. Rubber Co.
* Jenkins Bros.
Johns-Manville (Inc.)
* United States Rubber Co.

Packing, Rubber
Garlock Packing Co.
* Goodrich, B. F. Rubber Co.
* Jenkins Bros.
Johns-Manville (Inc.)
* United States Rubber Co.

Packing, Sheet
Garlock Packing Co.
* Goodrich, B. F. Rubber Co.
* Jenkins Bros.
Johns-Manville (Inc.)
* United States Rubber Co.

Paints, Concrete (For Industrial Purposes)
Smooth-On Mfg. Co.

Paint, Metal
* Dixon, Joseph Crucible Co.
* General Electric Co.
Johns-Manville (Inc.)

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* Westinghouse Elect. & Mfg. Co.

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Alteneder, Theo. & Sons
Dietzgen, Eugene Co.
Keuffel & Esser Co.
New York Blue Print Paper Co.
ParVell Laboratories
U. S. Blue Co.
Weber, F. Co. (Inc.)

Paper, Sensitized
Alteneder, Theo. & Sons
Dietzgen, Eugene Co.
Keuffel & Esser Co.
New York Blue Print Paper Co.
ParVell Laboratories
U. S. Blue Co.
Weber, F. Co. (Inc.)

Paper Mill Machinery
Farrel Foundry & Machine Co.

Paraffine Wax Plant Equipment
Bethlehem Shipbldg.Corp'n(Ltd.)
* Vogt, Henry Machine Co.

*Catalogue data of firms marked * appear in the A.S.M.E. Condensed Catalogues of Mechanical Equipment, 1923-24 Volums*

to reuse lubricating oil by means of circulation system; discusses batch and continuous system of purification.

Storage and Handling. Oil Storage and Handling Practice. Elec. Ry. Jl., vol. 64, no. 3, July 19, 1924, pp. 77–79, 6 figs. Information obtained from 57 electric railways shows that careful storage of lubricants eliminates waste, prevents contamination, minimizes fire hazard, and facilitates keeping of records; increased use of buses by railways makes necessary storage of gasoline in quantity.

Turbines. Characteristics of Efficient Turbine Oil, A. F. Brewer. Elec. Light & Power, vol. 2, no. 8, Aug. 1924, pp. 16–18 and 38, 2 figs. Discusses properties of oil, including viscosity, cooling ability, tendency to evaporate, fluid friction developed, demulsibility, water content, tendency to decompose, foaming and content, carbon content, sulphur and acids.

Viscosity. Viscosity and Surface Tension of Oils (Viskosität und Oberflächenspannung von Oelen), J. Don. Kolloid-Zeit., vol. 34, no. 5, May 1924, pp. 312–313, 1 fig. Experiments with mobile oil, rape, olive and other oils; lubricating properties.

LUBRICATION

Theory of. Some Notes on the Theory of Lubrication with Particular Application to the Michell Thrust and Journal Bearings, J. Ward. Inst. Mar. Engrs.—Trans., vol. 36, July 1924, pp. 141–185, 24 figs. Discusses dry, rolling, greasy and viscous friction, perfect lubrication; Michell viscometer; lubrication of parallel surfaces, inclined surfaces; flow of oil; pressure distribution; bearings, etc.

M

MACHINE SHOPS

Fire-Department. Efficiency in the Fire Department Machine Shop, J. C. Moran. Fire & Water Eng., vol. 76, no. 3, July 16, 1924, pp. 107–108, 112, 135–136, 7 figs. Methods which make Hartford shop a model; personnel and equipment; importance of good location for building. Abstract of paper read before New England Assn. Fire Chiefs.

Repairs Handling. A Simple and Economical Method of Handling Repairs, F. H. Colvin. Am. Mach., vol. 61, no. 5, July 31, 1924, pp. 189–190, 3 figs. Plan, worked out by Gould & Eberhardt, Newark, N. J., which cuts out much of the paper work and overhead expense in repair work.

MACHINE TOOLS

British Empire Exhibition. Machine Tools at the British Empire Exhibition, I. W. Chubb. Am. Mach., vol. 61, no. 5, July 31, 1924, pp. 177–179, 4 figs. Types and performances of British machine tools at Wembley.

Machine Tools at Wembley. Mech. Wld., vol. 76, nos. 1957 and 1959, July 4 and 18, 1924, pp. 2–4 and 34–36, 14 figs. Details of wheel and axle lathes, electric drives, tool equipment; broaching machines, gear-shaping machines by Vickers, Ltd., stamping presses, including single-action press with adjustable cam brake by Taylor & Challen Ltd.

Universal Metal-Cutting Machine. A Combination Type of Metal-Cutting Machine. Machy. (Lond.), vol. 24, no. 617, July 24, 1924, pp. 513–515, 7 figs. Universal machine especially adapted for reproducing various designs from enlarged patterns or drawings, either by punching, profiling, routing, milling, or engraving.

MACHINERY

Altitude, Influence of. Influence Exerted by Altitude on Apparatus, K. Lubowsky. Elec. Wld., vol. 84, no. 3, July 19, 1924, pp. 109–110. Influence of altitude on calculations connected with all apparatus which generates, distributes, or consumes energy. Correction factors for various types of apparatus; influence on heating; outputs and ratings; table for any height.

MACHINING METHODS

Eccentrics, Turning of. Tools and Fixtures for Turning Eccentrics, F. H. Mayoh. Machy. (N. Y.), vol. 30, no. 12, Aug. 1924, pp. 976–979, 11 figs. Points out methods to be used in machining eccentric parts under different conditions.

MARINE STEAM TURBINES

Reversing-Clutch. The Reversing-Clutch Marine Turbine, O. A. Wiberg. Engineering, vol. 118, no. 3056, July 25, 1924, pp. 144–145, 5 figs. Describes oil-operated reversing clutch in connection with mechanical reduction gear and its successful application to number of ships. Abstract of paper read before World Power Conference.

MATERIALS

Heat Conductivity of. Determination of Heat Conductivity of Engineering Materials (Ueber die Bestimmung der Wärmeleitfähigkeit technischer Materialien), Zeit. für Technische Physik, vol. 5, no. 6, 1924, pp. 233–236, 4 figs. Results of tests with materials used in building construction and machine construction.

MATERIALS HANDLING

Automobiles. Material-Handling Problems in Automobile Assembly, M. R. Dennison. Automotive Manufacturer, vol. 66, nos. 3 and 4, June and July 1924, pp. 24–26 and 10–12, 1 fig. June: Time and labor-saving methods used in large modern Studebaker plant at South Bend, with especial reference to stores and incoming parts; July: Tractor and trailer interplant transportation; instruction of storeroom men; labor-saving arrangements and devices.

Concrete Building Units, Manufacture. Economical Handling of Raw Materials in Building Unit Manufacture. Concrete, vol. 25, no. 1, July 1924, pp. 13–18, 6 figs. Summary of methods in common use in excavating and handling sand and gravel, according to conditions to be met.

Zinc Works. The Handling of Materials at the Risdon Works of the Electrolytic Zinc Co. of Australasia, Ltd., A. W. Cook. Australasian Inst. Min. & Met.—Proc., no. 52, Dec. 31, 1923, pp. 167–184, 9 figs. Details of handling at 100-ton zinc plant at Risdon covering area of 149 acres with elevation from 6 ft. to 163 ft. above high-water mark.

MEASUREMENTS

Length. Industrial Length Measurement, Standards of Measurement and Systems of Tolerances (La mesure industrielle des longueurs, Etalons de mesures et systèmes à tolérances), H. Stroh. Génie Civil, vol. 84, nos. 25 and 26, June 21 and 28, 1924, pp. 594–597, 615–617, 12 figs. Discusses length measurement in connection with production of good quantities and of interchangeable parts, establishing standards; mechanical precision and systems of tolerances; discusses symmetrical and asymmetrical tolerances, admissible wear of tolerances; standards for length measurement.

METALLOGRAPHY

Lehigh University. Metallography at Lehigh University, H. B. Pulsifer. Forging—Stamping—Heat Treating, vol. 10, no. 7, July 1924, pp. 276–278, 7 figs. Leading engineering colleges are coming to recognize metallography as most important of the aspects commonly assembled under metallurgy.

Polarized Light. Metallography in Polarized Light (Metallographie im polarisierten Licht), L. C. Glaser. Zeit. für Technische Physik, vol. 5, no. 6, 1924, pp. 253–260, 12 figs. Describes instruments and methods which by using polarized light enable one to recognize optical properties of structural elements and to measure them.

METALS

Deformation. Torsional Tests of Metals, Elastic and Permanent Deformation (Les essais de torsion des métaux, déformations élastiques et déformations permanentes), J. Seigle and F. Cretin. Génie Civil, vol. 84, nos. 23 and 24, June 7 and 14, 1924, pp. 545–549 and 565–568, 19 figs. Describes apparatus used; studies angles of torsion, torsion curves for elastic and permanent deformation, elastic limit of torsion, etc.

Diffusion in Solid State and Plasticity. The Trend in the Science of Metals, Z. Jeffries. Am. Inst. Min. & Met. Engrs.—Trans., Advance paper No. 1337-N, May 1924, 23 pp., 23 figs. Discusses diffusion in solid state and plasticity of metals.

Machining Qualities. A Method for Determining the Resistance of Metals to Drilling and Its Application to the Investigation of the Machineability of Metals, A. Kessner. Testing, vol. 1, no. 4, Apr. 1924, pp. 270–285, 11 figs. Describes drilling testing machine; some investigations carried out by means of Kessner machineability testing machine; standard comparison metals for drilling tests.

Melting. Fluxes and Slags in Metal Melting. Metal Industry (Lond.), vol. 25, no. 5, Aug. 1, 1924, pp. 101–102. Report of chief points in joint discussion of following contributions to recent symposium on slags and fluxes held by Faraday Soc. and Inst. Metals; General Introduction, Oxidizing Fluxes in Milling Non-Ferrous Metals; Slags from Lead, Copper and other Blast Furnaces, Use of Slags in Brass Melting; Slags in Melting Silver Alloys; and Sulphurizing and Desulphurizing by Basic Slags and Fluxes.

Non-Metallic Inclusions in. A Note on Non-Metallic Inclusions in Metals, with Special Reference to Aluminium, A. G. Lobley. Foundry Trade Jl., vol. 30, no. 412, July 10, 1924, p. 34. Discusses cryolite present in aluminum, nitrogen, carbon and aluminum; states that electric remelting is not harmful. Abstract of paper read at symposium on Slags and Fluxes, arranged by Faraday Soc., Inst. of Metals, Inst. of British Foundrymen and Non-Ferrous Research Assn.

Properties. Strength and Density of Synthetic Metal Bodies and Force of Adhesion between Metal Surfaces (Ueber Festigkeit und Dichte synthetischer Metallkörper und die Adhäsionskräfte zwischen Metallischen Oberflächen), E. Jaenichen. Zeit. für Elektrochemie, vol. 30, no. 4, Apr. 1924, pp. 175–180, 6 figs. Examines strength, density and elasticity of synthetic metal bodies of copper and iron.

Testing. Bending Tests with Rotating Bars (Essais de flexion avec rotation du barreau pour de fortes valeurs de la flèche de flexion), M. Cretin and M. Seigle. Revue de Métallurgie, vol. 21, no. 6, June 1924, pp. 358–367, 24 figs. Discusses principle of fatigue test by rotary bending; bending tests beyond elastic deformation.

The Jannin Method for Testing Metals as to Wear, and Its Application to Testing Antifriction Metals (Étude de la méthode de M. L. Jannin pour l'essai des métaux à l'usure et de son application à l'essai des métaux antifriction), M. P. Nicolau. Revue de Métallurgie, vol. 21, no. 6, June 1924, pp. 347–355, 1 fig. Shows that by this method resistance to wear of anti-friction metals cannot be determined, and that application of this method is limited to rapid determination of friction conditions.

MICROSCOPES

Illuminators for. Vertical Illuminator for Microscopes. Engineering, vol. 118, no. 3053, July 4, 1924, p. 30, 3 figs. Describes vertical illuminator recently introduced by R. & J. Beck, Ltd., London, in which reflector can be moved along two lines at right angles and can also be tilted about both these axes. It is thus possible to adjust position and angle of reflector as required.

Metallurgical. The Microscope as an Aid in Metallurgy, F. E. Lee. Can. Inst. Min. & Metallurgy—Bul., no. 147, July 1924, pp. 505–510, 8 figs. Application of microscope in problems arising from various operations of Tadanac Reduction Works.

MOTOR BUSES

Great Britain. British Bus Conditions. Motor Transport (Lond.), vol. 38, no. 1002, May 12, 1924, pp. 577–579, 9 figs. Outline of present motor-bus conditions in London and provinces, types of buses, single and double deckers, etc.

Municipal 'Bus Working in Detail. Motor Transport (Lond.), vol. 39, no. 1012, July 21, 1924, pp. 73–77, 3 figs. How organization and record keeping of Reading omnibuses insure efficiency.

New York City. Coach and Bus Operation in New York, J. A. Beeler. Elec. Ry. Jl., vol. 64, no. 6, Aug. 9, 1924, pp. 195–198, 4 figs. Details of Fifth Ave. and municipal lines; difference in service and buses; bus situation in Manhattan and Bronx.

Reading, England. Municipal Motor 'Bus Services and Building Development. Motor Transport (Lond.), vol. 39, no. 1010, July 7, 1924, pp. 15–16, 3 figs. When first introduced into Reading buses were regarded only as temporary system, but they promise to become permanent.

Six-Wheel. Unit Accessibility Features Six-Wheel Bus. Motor Transport (Phila.), vol. 30, no. 8, July 10, 1924, pp. 298–300, 4 figs. Particulars of first motor-bus model of Six-Wheel Co., Phila.; easy riding qualities, durability and easy servicing outstanding features in design; units quickly detached; steel body construction simplifies repair work.

MOTOR-TRUCK TRANSPORTATION

Development. The Position of the Motor Truck in Transportation, T. R. Dahl. Power Wagon, vol. 33, no. 236, July 1924, pp. 15–19, 2 figs. Discusses economics of trucking, savings in marketing, handling local freight, etc. Abstract of paper read before World Motor Transport Congress.

Milk. Transportation of Milk by Motor Truck, H. R. Trumbower. Public Roads, vol. 5, no. 5, July 1924, pp. 1–18, 11 figs. Results of survey of milk transportation for eight large cities.

MOTOR TRUCKS

Brakes. Air Brakes for Motor-Truck Trains (Die Druckluftbremse für Lastkraftzüge), T. Kollinek. Motorwagen, vol. 27, no. 18, June 30, 1924, pp. 316–318, 3 figs. Design and construction of Knorr air brake for heavily loaded tracks and trailers, acting on every wheel of train.

Gas Producers for. Most Recent Application of Transportable Gas Producers (Les dernières applications des gazogènes transportables), C. Mathieu. Industrie des Tramways Chemins de Fer et Transports Publics Automobiles, vol. 18, no. 210, June 1924, pp. 197–209, 18 figs. Review of latest types of gas producers for traction by road or rail.

Steam. Another Shaft-Driven Steam Waggon. Motor Transport (Lond.), vol. 39, no. 1010, July 7, 1924, pp. 47–49, 6 figs. Details of 6-ton truck combining best features of steam and gasoline practice, made by Mann's Patent Steam Cart and Waggon Co., Ltd.

Trailers. Something New in Tipping Trailers. Indian East. Engr., vol. 54, no. 5, May 1924, pp. 216–217, 5 figs. Describes "Eagle" patent two-wheeler, designed to obtain best results from Fordson and similar types of light tractors built by Eagle Eng. Co., Ltd., Warwick, Eng.

O

OIL

Cracking. The Dubbs Process for Cracking Oil. Petroleum Times, vol. 12, no. 287, July 5, 1924, pp. 5–8, 2 figs. Principles of Dubbs process, equipment and operation, commercial results, results with heavy oils and cracking products.

Cut Oil, Electrical Dehydration of. The Electrical Dehydration of Cut Oil, F. D. Mahone. Am. Inst. Min. & Met. Engrs.—Trans., Advance paper No. 1354-P, July 1924, 5 pp. Much crude oil, as produced from well, carries varying amounts of water, which may be present as free water in globules sufficiently large to settle out, in time, if fluid is allowed to stand, or as an emulsion formed by myriads of minute water particles each surrounded and entrapped by a film of oil through which it cannot break under action of gravity alone. Such an emulsified mixture of oil and water is termed "cut oil." Describes apparatus for breaking up emulsion.

Recovery. Tube Section Treating Plant Cuts Oil Recovery Costs 6 Cents a Barrel, P. Wagner. Nat. Petroleum News, vol. 16, no. 30, July 23, 1924, pp. 71–72, 3 figs. Tube section treating installation of Humble Oil & Refg. Co. consists of four tube sections, 3 ft. long, and three plain sections, 5 ft. long; gives records of results.

Refining. The Use of Bauxite in Petroleum Refining. Petroleum Times, vol. 12, no. 287, July 5, 1924, pp. 17–18. Bauxite is colloidal adsorptive of first order for organic sulphur derivatives; freshly ignited bauxite gives best results; bauxite per se is complete and sufficient refining agent for kerosene; other sulphurous distillates are also capable of purification by bauxite.

Production from Coal. The Director of Fuel Research on Oil and Coke Production from Coal, C. H. Lander. Gas Wld., vol. 81, no. 2086, July 12, 1924, pp. 8–10 (annual coal supp.). Discusses yield and quality of oil, market for coke, and ammonia yield.

Manufactured by Advertisers — CLASSIFIED LIST OF MECHANICAL EQUIPMENT — Alphabetical List on page 156

Pasteurizers
* Vilter Mfg. Co.

Pencils, Drawing
Alteneder, Theo. & Sons
American Lead Pencil Co.
Dietzgen, Eugene Co.
* Dixon, Joseph Crucible Co.
Keuffel & Esser Co.
New York Blue Print Paper Co
ParVell Laboratories
U. S. Blue Co.
Weber, F. Co. (Inc.)

Penstocks
Smith, S. Morgan Co.

Pile Drivers
Clyde Iron Works Sales Co.
Lidgerwood Mfg. Co.

Pinions, Rolling Mill
* Foote Bros. Gear & Machine Co.
Mackintosh-Hemphill Co.

Pinions, Steel
* Foote Bros. Gear & Machine Co.
* General Electric Co.

Pipe, Brass and Copper
* Wheeler Condenser & Engrg. Co.

Pipe, Cast Iron
* Builders Iron Foundry
* Central Foundry Co.
* U. S. Cast Iron Pipe & Fdry. Co.

Pipe, Forge Welded
* American Spiral Pipe Wks

Pipe, Riveted
* American Spiral Pipe Wks.
* Springfield Boiler Co.
Steere Engineering Co.
* Titusville Iron Works Co.
* Walsh & Weidner Boiler Co.

Pipe, Soil
* Central Foundry Co.

Pipe, Spiral Riveted
* American Spiral Pipe Wks

Pipe, Steel
* Crane Co.
Steere Engineering Co.

Pipe, Welded
* American Spiral Pipe Wks
* Crane Co.
* Pittsburgh Valve, Fdry. & Const. Co.
Steere Engineering Co.

Pipe, Wrought Iron
Byers, A. M. Company
* Crane Co.

Pipe Coils, Covering, Fittings, etc.
(See Coils, Covering, Fittings, etc., Pipe)

Pipe Cutting and Threading Machines
* Crane Co.
* Landis Machine Co. (Inc.)

Piping, Ammonia
* Frick Co. (Inc.)

Piping, Power
* Crane Co.
* Pittsburgh Valve, Fdry. & Const. Co.
Steere Engineering Co.
* Vogt, Henry Machine Co.

Pitot Tubes
(See Tubes, Pitot)

Planimeters
Alteneder, Theo. & Sons
* American Schaeffer & Budenberg Corp'n
* Bristol Co.
* Crosby Steam Gage & Valve Co.
Dietzgen, Eugene Co.
Keuffel & Esser Co.
New York Blue Print Paper Co.
ParVell Laboratories
U. S. Blue Co.
Weber, F. Co. (Inc.)

Plate Metal Work
(See Steel Plate Construction)

Pointers, Bolt
* Landis Machine Co. (Inc.)

Polishing Machinery
* Builders Iron Foundry
* Royersford Fdry. & Mach. Co.

Powdered Fuel Equipment (for Boiler and Metallurgical Furnaces)
* Allis-Chalmers Mfg. Co.
* Combustion Engineering Corp'n
Grindle Fuel Equipment Co.
* Quigley Furnace Specialties Co.
* Smidth, F. L. & Co.
* Worthington Pump & Machinery Corp'n

Power Transmission Machinery
* Allis-Chalmers Mfg. Co.
* Brown, A. & F. Co.
Chain Belt Co.
* Diamond Chain & Mfg. Co.
* Falls Clutch & Machinery Co.
Farrel Foundry & Machine Co.
* Foote Bros. Gear & Machine Co.
* Franklin Machine Co.
* General Electric Co.
Hill Clutch Machine & Fdry. Co.
* Hyatt Roller Bearing Co.
* Jones, W. A. Fdry. & Mach. Co.
Link-Belt Co.
* Medart Co.
* Morse Chain Co.
Palmer-Bee Co.
* Royersford Fdry. & Mach. Co.
* Smidth, F. L. & Co.
Smith, S. Morgan Co.
* Woods, T. B. Sons Co.

Preheaters, Air
* Combustion Engineering Corp'n
Prat-Daniel Corporation

Presses, Baling
* Franklin Machine Co.

Presses, Draw
* Niagara Machine & Tool Works

Presses, Extruding
Farrel Foundry & Machine Co.

Presses, Foot
* Niagara Machine & Tool Wks
* Royersford Fdry. & Mach. Co.

Presses, Forming
Farrel Foundry & Machine Co.
* Niagara Machine & Tool Wks.

Presses, Power
* Niagara Machine & Tool Works

Presses, Hydraulic
* Falls Clutch & Machinery Co.
Farrel Foundry & Machine Co.
Mackintosh-Hemphill Co.

Presses, Punching and Trimming
Long & Allstatter Co.
* Niagara Machine & Tool Works
* Royersford Fdry. & Mach. Co.

Presses, Sheet Metal Working
* Niagara Machine & Tool Works

Presses, Toggle
* Niagara Machine & Tool Works

Presses, Wax
* Vogt, Henry Machine Co.

Pressure Gages, Regulators, etc.
(See Gages, Regulators, etc., Pressure)

Producers, Gas
* De La Vergne Machine Co.
* Westinghouse Electric & Mfg. Co.
* Worthington Pump & Mchry. Corp'n

Projectors, Flood Lighting
* Westinghouse Elect. & Mfg. Co.

Propellers
* Morris Machine Works

Pulleys, Friction Clutch
* Allis-Chalmers Mfg. Co.
* Brown, A. & F. Co.
* Falls Clutch & Machinery Co.
Hill Clutch Machine & Fdry. Co.
Johnson, Carlyle Machine Co.
* Jones, W. A. Fdry. & Mach. Co.
Link-Belt Co.
* Medart Co.
* Wood's, T. B. Sons Co.

Pulleys, Iron
* Brown, A. & F. Co.
Chain Belt Co.
* Falls Clutch & Machinery Co.
* Gifford-Wood Co.
Hill Clutch Machine & Fdry. Co.
* Jones, W. A. Fdry. & Mach. Co.
Link-Belt Co.
* Medart Co.
* Wood's, T. B. Sons Co.

Pulleys, Steel
* Medart Co.

Pulleys, Wood
* Medart Co.

Pulverizers
* Brown, A. & F. Co.
* Combustion Engineering Corp'n
* Smidth, F. L. & Co.

Pulverizers, Cement Materials
Pennsylvania Crusher Co.

Pulverizers, Coal
* Combustion Engineering Corp'n
* Furnace Engineering Co.
Grindle Fuel Equipment Co.
Pennsylvania Crusher Co.

Pulverizers, Limestone
Pennsylvania Crusher Co.

Pump Governors, Valves, etc.
(See Governors, Valves, etc. Pump)

Pumping Engines
(See Engines, Pumping)

Pumping Systems, Air Lift
* Ingersoll-Rand Co.

Pumps, Acid
Buffalo Steam Pump Co.
Ingersoll-Rand Co.
* Nordberg Mfg. Co.
Taber Pump Co.
* Titusville Iron Works Co.

Pumps, Air
* Goulds Mfg. Co.
* Ingersoll-Rand Co.
* Westinghouse Electric & Mfg. Co.
* Wheeler, C. H. Mfg. Co.

Pumps, Ammonia
Buffalo Steam Pump Co.
* Goulds Mfg. Co.
* Ingersoll-Rand Co.
* Vogt, Henry Machine Co.
* Worthington Pump & Machinery Corp'n

Pumps, Boiler Feed
* Allis-Chalmers Mfg. Co.
Bethlehem Shipbldg.Corp'n(Ltd.)
Buffalo Steam Pump Co.
* Coppus Engineering Corp'n
* De Laval Steam Turbine Co.
* Goulds Mfg. Co.
* Ingersoll-Rand Co.
* Kerr Turbine Co.
* Wheeler, C. H. Mfg. Co.
* Worthington Pump & Machinery Corp'n

Pumps, Centrifugal
* Allis-Chalmers Mfg. Co.
Bethlehem Shipbldg.Corp'n(Ltd.)
Buffalo Steam Pump Co.
* Cramp, Wm. & Sons Ship & Engine Bldg. Co.
* DeLaval Steam Turbine Co.
* Goulds Mfg. Co.
* Ingersoll-Rand Co.
* Kerr Turbine Co.
Lammert & Mann Co.
* Morris Machine Works
* Nordberg Mfg. Co.
Taber Pump Co.
* Westinghouse Electric & Mfg. Co.
* Wheeler, C. H. Mfg. Co.
* Wheeler Cond. & Engrg. Co.
* Worthington Pump & Machinery Corp'n

Pumps, Condensation
Buffalo Steam Pump Co.
* Ingersoll-Rand Co.
* Wheeler, C. H. Mfg. Co.

Pumps, Deep Well
* Allis-Chalmers Mfg. Co.
* Goulds Mfg. Co.
* Ingersoll-Rand Co.
* Morris Machine Works
* Worthington Pump & Machinery Corp'n

Pumps, Dredging
* Ingersoll Rand Co.
* Morris Machine Works
* Worthington Pump & Machinery Corp'n

Pumps, Electric
* Allis-Chalmers Mfg. Co.
Buffalo Steam Pump Co.
* Goulds Mfg. Co.
* Ingersoll-Rand Co.
* Morris Machine Works
* Nordberg Mfg. Co.
Taber Pump Co.
* Worthington Pump & Machinery Corp'n

Pumps, Elevator
Buffalo Steam Pump Co.
* Goulds Mfg. Co.
* Worthington Pump & Machinery Corp'n

Pumps, Filter Press
Buffalo Steam Pump Co.
* Goulds Mfg. Co.

Pumps, Hand
* Goulds Mfg. Co.
Taber Pump Co.

Pumps, Hydraulic
* American Fluid Motors Co.
Farrel Foundry & Machine Co.

Pumps, Hydraulic Pressure
Bethlehem Shipbldg.Corp'n(Ltd.)
Buffalo Steam Pump Co.
* Goulds Mfg. Co.
* Ingersoll-Rand Co.
* Morris Machine Works
* Worthington Pump & Machinery Corp'n

Pumps, Measuring
Wayne Tank & Pump Co.

Pumps, Measuring (Gasoline or Oil)
* Bowser, S. F. & Co. (Inc.)

Pumps, Oil
Bethlehem Shipbldg.Corp'n(Ltd.)
* Bowser, S. F. & Co. (Inc.)
Buffalo Steam Pump Co.
* Goulds Mfg. Co.
* Ingersoll-Rand Co.
Lunkenheimer Co.
Taber Pump Co.
* Worthington Pump & Machinery Corp'n

Pumps, Oil, Force-Feed
Bethlehem Shipbldg.Corp'n(Ltd.)
* Bowser, S. F. & Co. (Inc.)
* Goulds Mfg. Co.
Lunkenheimer Co.

Pumps, Oil (Hand)
* Bowser, S. F. & Co. (Inc.)
* Goulds Mfg. Co.
Lunkenheimer Co.

Pumps, Power
* Allis-Chalmers Mfg. Co.
Bethlehem Shipbldg.Corp'n(Ltd.)
Buffalo Steam Pump Co.
* Goulds Mfg. Co.
* Ingersoll-Rand Co.
* Nordberg Mfg. Co.
* Wheeler Cond. & Engrg. Co.
* Worthington Pump & Machinery Corp'n

Pumps, Rotary
* Goulds Mfg. Co.
Lammert & Mann Co.
Taber Pump Co.

Pumps, Steam
* Allis-Chalmers Mfg. Co.
Buffalo Steam Pump Co.
* Ingersoll-Rand Co.
* Nordberg Mfg. Co.
* Wheeler, C. H. Mfg. Co
* Wheeler Cond. & Engrg. Co.
* Worthington Pump & Machinery Corp'n

Pumps, Sugar House
* Allis-Chalmers Mfg. Co.
Buffalo Steam Pump Co.
* Goulds Mfg. Co.
* Ingersoll-Rand Co.
* Worthington Pump & Machinery Corp'n

Pumps, Sump
Buffalo Steam Pump Co.
* Goulds Mfg. Co.
* Ingersoll-Rand Co.
* Morris Machine Works
* Smidth, F. L. & Co.
Taber Pump Co.

Pumps, Tank
Buffalo Steam Pump Co.
* Goulds Mfg. Co.
* Ingersoll-Rand Co.
Taber Pump Co.
* Wheeler, C. H. Mfg. Co.
* Wheeler Cond. & Engrg. Co.
* Worthington Pump & Machinery Corp'n

Pumps, Turbine
* Allis-Chalmers Mfg. Co.
Buffalo Steam Pump Co.
* De Laval Steam Turbine Co.
* General Electric Co.
* Goulds Mfg. Co.
* Ingersoll-Rand Co.
* Kerr Turbine Co.
* Morris Machine Works
* Westinghouse Electric & Mfg. Co.
* Worthington Pump & Machinery Corp'n

Pumps, Vacuum
Buffalo Steam Pump Co.
* Croll-Reynolds Engrg. Co. (Inc.)
* Goulds Mfg. Co.
* Ingersoll-Rand Co.
Lammert & Mann Co.
* Nordberg Mfg. Co.
* Wheeler, C. H. Mfg. Co.
* Wheeler Cond. & Engrg. Co.
* Worthington Pump & Machinery Corp'n

Punches, Multiple
* Long & Allstatter Co.
Mackintosh-Hemphill Co.

Punches, Power
* Niagara Machine & Tool Works
* Royersford Fdry. & Mach. Co.

Punches and Dies
* Royersford Fdry. & Mach. Co.

Punching and Coping Machines
* Long & Allstatter Co.

Punching and Shearing Machines
* Long & Allstatter Co.
* Royersford Fdry. & Mach. Co.

Purifiers, Ammonia
* Frick Co. (Inc.)

Purifiers, Oil
* Bowser, S. F. & Co. (Inc.)
Elliott Co.

Purifiers, Water
Reisert Automatic Water Purifying Co.

Purifying and Softening Systems, Water
Reisert Automatic Water Purifying Co.
International Filter Co.
* Scaife, Wm. B. & Sons Co.

*Catalogue data of firms marked * appear in the A.S.M.E. Condensed Catalogues of Mechanical Equipment, 1923-24 Volume*

Extract of paper read before World Power Conference. [See also PETROLEUM.]

OIL ENGINES

Solid-Injection. Types of Modern Power-Plant Oil Engines. Oil Engine Power, vol. 2, no. 7, July 1924, pp. 386–388, 2 figs. Bessemer Gas Engine Co., Grove City, have joined with Atlas-Imperial Engine Co., Oakland, Cal., in manufacture of airless-injection oil engines by acquiring Eastern manufacturing rights. Gives table showing how oil engine effects savings in comparison with every other type of heat prime mover.

Fuels, Specifications for. Standard Specifications for Oil Engine Fuels. Motorship, vol. 9, no. 7, July 1924, pp. 506–508, 3 figs. Compilation of replies to communication addressed by "Motorship" to representatives of marine and stationary oil-engine industry to users of engines and oil companies on possibility of recommending uniform specifications for oil-engine fuels.

Stationary. Stationary Oil Engines at the British Empire Exhibition. Oil Engine Power, vol. 2, no. 7, July 1924, pp. 374–377, 5 figs. Discusses oil engines exhibited at British Empire Exhibition at Wembley, including airless-injection engines, both of surface-ignition and high compression kind.

OIL FUEL

Burners. The Fuel Oil Burner from Fire Chief's Standpoint, A. J. Caulfield. Fire & Water Eng., vol. 76, no. 4, July 23, 1924, pp. 157–158 and 180. Discusses hazards of chimney defects; accepted and unaccepted types of burners; some suggestions for better maintenance of burners. Abstract of paper read before New England Assn. Fire Chiefs.

OIL WELLS

Effects of Extraneous Gas on. Effects of Extraneous Gas on Oil Wells, M. J. Kirwan. Oil & Gas Jl., vol. 23, no. 8-A, July 17, 1924, pp. 32, 96–100, 138–139 and 142–143, 1 fig. Exhaustive study of migrating gas on oil production from Lyons sand shows output was greatly increased.

Pechelbronn. Mining and Refining at Pechelbronn, E. C. Isom. Oil & Gas Jl., vol. 23, no. 10-A, July 31, 1924, pp. 124 and 140, 2 figs. Drilling wells, sinking shafts and treating sand employed to extract oil; refinery adopting many American methods.

The Oil Mines of Pechelbronn, J. F. Carter. Petroleum Wld., vol. 21, no. 286, July 1924, pp. 268–270. Impressions of T. E. Swigart, superintendent of experimental station, Bur. Mines, received from inspection of this district where there are extensive oil mines as well as producing wells, to obtain information on properties of oil sands.

Pumping. Long Stroke Pumping and Meiers-Reskey Drive, R. E. D. Foster. Oil Trade Jl., vol. 15, no. 7, July 1924, pp. 33–36, 86–87, 3 figs. Present day equipment; crank extension pumping. Describes H. M. A. (Meiers) geared long-stroke pump.

Plugging. Plugging Wells With Lead Wool; Method and Material Described. Oil & Gas Jl., vol. 23, no. 8-A, July 17, 1924, pp. 72 and 80, 1 fig. Discusses "top" and "bottom" water, pumping water, lead wool, plugging methods, physical properties, etc.

Rotary-Drilled. Use of Mud-Fluid in Rotary Drilled Wells, M. J. Kirwan. Petroleum Wld., vol. 21, no. 286, July 1924, pp. 265–267, 2 figs. Results of study and experiments by government engineers in Tonkawa and other fields on use of mud fluid for protecting upper oil and gas deposits cased off in wells drilled by rotary method; preparation of fluid important. Paper read before meeting of Tulsa Geological Soc.

ORDNANCE

Stores Control. Ordnance Stores Control, L. D. Booth. Army Ordnance, vol. 5, no. 25, July–Aug. 1924, pp. 431–435 and 470, 5 figs. Discusses control of supplies by commanding generals of troops; shows review sheet, consolidated review records, abstract of reviews, transfer order and report of stores.

OXY-ACETYLENE WELDING

Boilers. Rules of the French Associations of Steam Boiler Users for Repairing Boilers by Means of Autogenous and Electric Welding (Recommandations relatives aux réparations de chaudières à vapeur par soudure au chalumeau ou à l'arc électrique). Associations Françaises de Propriétaires d'Appareils à Vapeur-Bul., vol. 5, no. 16, Apr. 1924, pp. 91–97. Rules covering repairs permissible, choice of material and kind of welding, carrying out welds, tests.

Industry. Welding and Its Applications (La soudure et ses applications). Revue de l'Ingenieur, Feb. 1924, 128 pp., 186 figs. Series of articles by different authors dealing with production of oxygen and acetylene; apparatus used in oxy-acetylene and electric welding; micrographic study of seams; electric resistance welding; examining autogenous seams by means of x-rays; welding of aluminum; autogenous welding in naval construction, coppersmith's work, automobiles, gas holders, railroad shops, underground conduits, etc.

Manganese Steel. Welding of Manganese Steel, S. W. Miller. Acetylene Jl., vol. 26, no. 2, Aug. 1924, pp. 65–71, 14 figs. Preliminary report of Gas Welding Committee of Am. Bur. Welding. Discusses what happens during welding of manganese steel, how actual operation may be best conducted and what structural results of welding are in both base metal and weld.

Medium High-Carbon Steel. Autogenous Welding. Ry. & Locomotive Eng., vol. 37, no. 7, July 1924, pp. 202–204, 4 figs. Investigation on steel of axles and wheels that fall under classification of medium high-carbon steel; rolled steel wheels, couplers, low-carbon steel, wrought iron, cast iron, cast-iron wheels non-ferrous metal and torch cutting.

Monel Metal. The Autogenous Welding of Monel Metal by the Oxy-Acetylene Process. Machy. (Lond.), vol. 24, no. 617, July 24, 1924, pp. 528–530, 12 figs. Discusses properties of monel metal, pressure of blowpipe, oxy-acetylene welding of rods, bars, sheets, plates and castings, and gives examples.

Non-Ferrous Metals. Oxy-Acetylene Welding of Non-Ferrous Metals, A. S. Kinsey. Am. Welding Soc.-Jl., vol. 3, no. 6, June 1924, pp. 27–51, 8 figs. Describes oxy-acetylene welding of copper, brass, bronze, aluminum, monel metal, nickel and lead. Bibliography.

Pressure Vessels. An Investigation of Welded Pressure Vessels. Am. Welding Soc., bul. no. 5, June 1924, 152 pp., 120 figs. Report of Pressure Vessel Committee of Am. Bur. of Welding covering recommendations to A.S.M.E. Boiler Code Committee, comments on construction, design, hydrostatic hammer test, welding wire, tests of welded specimens, marking and stamping, etc.

Railway Shops. Report on Autogenous and Electric Welding. Ry. Rev., vol. 75, no. 4, July 26, 1924, pp. 125–133, 23 figs. Gives results of investigations with reference to building up flat spots on steel and steel-tired wheels, building up of worn collars at journal ends of axles, and welding of fractures in couplers; recommendations affecting gas and electric welding limits and regulations of report for 1919. Paper presented before annual convention of Am. Ry. Assn., Div. V, Mechanical.

Welding Equipment in a Railroad Shop, J. S. Heaton. Ry. Mech. Engr., vol. 98, no. 7, July 1924, pp. 430–433, 6 figs. Modern tools should be provided so that operator may perform more accurate and efficient work.

Torch Uses. Variety of Torch Uses, C. W. Geiger. Welding Engr., vol. 9, no. 7, July 1924, pp. 22–25, 11 figs. Largest industrial firms on Pacific Coast use torch in many different and profitable ways.

Welders, Training. Training Course for Oxy-Acetylene Welders. Am. Welding Soc., Bul. no. 4, Apr. 1924, 29 pp. Report of Committee on Training of Welding Operators of Am. Bur. of Welding.

P

PAINTS

Red Lead. Some Observations on Red Lead as a Paint Pigment, E. F. Hickson and H. R. Snoke. Paint Manufacturers' Assn. of U. S., Sci. Sec., circular no. 207, July 1924, pp. 47–60, 6 figs. Discusses flow test used in conjunction with brush test for determining painting qualities of red lead. Paper read before Sec. of Paint & Varnish Chemistry at meeting of Am. Chem. Soc.

PAPER MANUFACTURE

Liming of Blowpits. What Causes Liming of Blowpits? Paper, vol. 34, no. 14, July 24, 1924, pp. 605–610. Investigation of liming of blowpits in sulphite mills reveals various causes, but cold air is chief factor.

Rag-Cooking Methods. European Rag Cooking Methods, R. Sansone. Paper, vol. 34, no. 13, July 17, 1924, pp. 557–559, 2 figs. Account of various forms and types of boilers used in European paper mills where rags and reeds are cooked for pulp. Translated from Papeterie, pp. 246–253, 1924.

Sizing. Colloid Studies in Rosin Sizing, R. Lorenz. Paper Trade Jl., vol. 78, nos. 23, 24, 25 and 26, and vol. 79, no. 1, June 5, 12, 19, 26 and July 3, 1924, pp. 61–66, 47–52, 43–45, 52–54 and 51–55, 13 figs. Colophony and its use; preparation of pure raw material; dispersoid analysis; surface tension and internal friction; chemical equilibrium in sizing beater; flocculation phenomena of rosin sizing; action of aluminum hydrates in sizing and electrostatic sizing theory. Translated from Papier-Fabrikant, 1923.

Vacuum Drying. Drying Paper in a Vacuum, T. J. Keenan. Paper, vol. 34, no. 16, Aug. 7, 1924, pp. 699–701, 2 figs. Describes operation of Minton vacuum paper machine drier at So. Norwalk, Conn. (Norwalk Co.), paper being dried in 28 in. vacuum.

PAPER MILLS

Cutless Bearings for. Cutless Bearings for Paper Mills, C. F. Sherwood. Paper, vol. 34, no. 13, July 17, 1924, pp. 565–567. Application of rubber cutless bearings as substitute for ordinary bearings on wet end of Fourdrinier machine.

Electric Boilers and Digesters. Electric Boilers and Digesters, R. Sansone. Paper, vol. 34, no. 13, July 17, 1924, pp. 561–562, 2 figs. Electrically operated apparatus urged for use in pulp and paper mills for steam generation and direct heating of liquors.

Oil-Fuel Burning. Fuel Oil Burning at Paper Mill, A. Fette. So. Engr., vol. 41, no. 5, July 1924, pp. 35–41, 22 figs. Details of installation of plant of Charles Boldt Paper Mills Co., New Iberia, La., which was designed for burning coal or fuel oil.

PATENTS

Law. Inventors and Patentees, J. R. Langley. Elec. Jl., vol. 21, no. 7, July 1924, pp. 326–330. Discusses U. S. law and patent office practice, covering issue of patents, conception of inventions and reduction to practice, preservation of evidence, interferences, etc.

PATTERNS

Foundry. Rapping and Drawing Patterns, B. Shaw and J. Edgar. Mech. Wld., vol. 76, no. 1960, July 25, 1924, pp. 54–55, 5 figs. Discusses difference for repetition work and for jobbing work, lifting straps and how to fit them.

PEAT

Production. The Utilization of Peat for Power Production, G. K. Fletcher. World Power, vol. 2, no. 7, July 1924, pp. 19–22. Discusses difficulties arising from moisture content, cost, and advantages of peat production.

PETROLEUM

Colorado. Survey of Petroleum Progress, C. M. Rath, F. H. Lahee, H. T. Morley and J. R. Jones. Min. & Metallurgy, vol. 5, no. 212, Aug. 1924, pp. 378–383, 1 fig. Series of articles covering present status of petroleum industry in Colorado; New Richland field, Navarro County, Texas; evaporation losses in field storage tanks; extensions of prospecting permits.

Oklahoma. The Tonkawa Field, Oklahoma, G. C. Clark and F. L. Aurin. Am. Assn. Petroleum Geologists—Bul., vol. 8, no. 3, May-June 1924, pp. 269–283, 7 figs. Discusses location of Tonkawa field, history and development, surface and subsurface stratigraphy, possibilities for deeper production.

The Tonkawa Oil and Gas Field, Oklahoma, J. F. Hosterman. Am. Assn. Petroleum Geologists—Bul., vol. 8, no. 3, May-June 1924, pp. 284–300, 3 figs. Discusses location, stratigraphy, structure, drilling systems, casing problems, pipe lines, development of deeper sand.

Oregon. Petroleum Possibilities of Western Oregon W. DuPre Smith. Eeonomic Geology, vol. 19, no. 5, Aug. 1924, pp. 455–465, 1 fig. Discusses history of drilling operations, gives tentative table of stratigraphy of western Oregon; details of prospective fields; concludes that western Oregon is territory of possible but not probable petroleum reserve.

Evaporation Loss. Evaporation Loss of Petroleum Theories and Their Application, J. H. Wiggins. Am. Inst. Min. & Met. Engrs.—Trans., Advance paper No. 1353-P, July 1924, 8 pp. Pictures economic phase of evaporation losses and actual evaporative conditions in handling and storing crude and gasoline in United States; discusses some of the theories of physics involved in evaporation loss; and describes application of these theories to handling oil and gas on producing properties.

New Mexico. The Petroleum Situation in New Mexico, C. T. Kirk and E. G. Woodruff. Oil Trade Jl., vol. 15, no. 8, Aug. 1924, pp. 30–34, 52 and 54, 1 fig. Gives general information on geology and petroleum possibilities of New Mexico; generalized tabulation of geological formations.

PIPE

Threading. Pipe Threading in Oil Field Service, F. D. Bostaph. Oil Trade Jl., vol. 15, no. 7, July 1924, pp. 40–44. Investigation shows that greater percentage of trouble develops when long threaded pieces and couplings are being screwed together in field than when shorter couplings and threads were used. Concludes that threading chasers as in use in all threading machines at present time do not reproduce pitch of their own threads on pipe in all cases.

PIPE, CAST-IRON

Bronze Welding in. Bronze Welding Cast Iron Pipe in Chicago. Acetylene Jl., vol. 26, no. 2, Aug. 1924, pp. 78–80, 9 figs. Peoples Gas Light & Coke Co. are laying 6-in cast-iron bronze-welded gas line in Nordica Ave.; welding is accomplished by fusing tobin bronze to cast-iron pipe in band completely around joint.

Spun. "Spun" Iron Pipes. Roy. Engrs. Jl., vol. 38, no. 2, June 1924, pp. 249–251, 1 fig. Details of preparing chromium-steel mold revolvable at high speed, pouring from sector-shape ladle containing exact quantity of metal for one pipe, etc.

PIPE LINES

Friction of. Pipe Friction. Mech. Wld., vol. 76, no. 1958, July 11, 1924, pp. 21–22, 2 figs. Discusses available formulas for calculating frictional resistance in pipe lines for water, applicable mainly to power-plant work.

Welding. Report on Welding of Pipe, G. O. Carter. Am. Welding Soc.—Jl., vol. 3, no. 7, July 1924, pp. 13–19. Discusses welding applied to very extensive pipe lines, large and small plants and installations, including long oil and gas pipe, etc., organization of welding screws, cost of welding, etc.

POWER

Earth's Internal Heat, Utilization of. Power from the Earth's Heat, T. T. Read. Mech. Eng., vol. 46, no. 8, Aug. 1924, pp. 446–449, 8 figs. Discusses increase of earth's temperature toward its center. Gives résumé of published material about actual installations at favorable places on earth's surface, and plans proposed by well-known engineers for further development.

New England Requirements. Power Requirements and Source of Supply of New England, C. T. Main, H. I. Harriman and D. C. Jackson. Boston Soc. Civil Engrs.—Jl., vol. 11, no. 5, May 1924, pp. 193–227. Report of Committee of Associated Industries of Mass., covering kinds and amount of present power, cost, available new sources, probable demand for power from new sources, probable cost of supplying it, coal prices, fuel oil for power, Diesel engine; with summary and general conclusions.

World Power Conference. The First World Power Conference. World Power, vol. 2, no. 7, July 1924, pp. 7–18. Detailed program and list of papers, June 30 to July 12, 1924.

The Significance of the First World Power Conference. World Power, vol. 2, no. 7, July 1924, pp. 1–6. Discusses object, focusing information on policy of main countries in development of power resources; evolution of international power policy; natural power resources.

Manufactured by Advertisers — CLASSIFIED LIST OF MECHANICAL EQUIPMENT — Alphabetical List on page 156

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*Catalogue data of firms marked * appear in the A.S.M.E. Condensed Catalogues of Mechanical Equipment, 1923-24 Volume*

POWER PLANTS

British Empire Exhibition. Power Plants at Wembley. Power Engr., vol. 19, no. 220, July 1924, pp. 256–268, 20 figs. Survey of prime movers employed at British Empire Exhibition to furnish power and lighting to exhibitors and for other necessary services.

The First World Power Conference at Wembley. Power House, vol. 17, no. 15, Aug. 5, 1924, pp. 21–33, 3 figs. Complete report of deliberations of engineers from every part of globe at British Empire Exhibition and description of power plant in operation at Wembley.

Cigar Factory. The Power Plant of the World's Largest Cigar Factory, T. G. Thurston. Nat. Engr., vol. 28, no. 8, Aug. 1924, pp. 360–364, 8 figs. Description of H. Fendrich Inc., power plant at Evansville, Ind., largest single unit cigar factory in world, high efficiency, ease of operation and smokeless combustion; lighting, ventilation, and large number of instruments of special interest.

Equipment Purchasing. Purchasing Power Plant Equipment. Power Plant Eng., vol. 28, no. 15, Aug. 1, 1924, pp. 795–796. Specifications must be complete and definite. Bids must be brought to a comparative basis analysis.

POWER TRANSMISSION

Electric, Norway-Denmark. Transmission of Electric Power From Norway to Denmark, A. R. Angelo. Engineering, vol. 118, no. 3055, July 18, 1924, p. 114. In 1921 three commissions were appointed, one by Danish, one by Norwegian, and one by Swedish State, with object of investigating question of transmission of electric power from Norway to Denmark. Main points of report submitted in 1923 by a Joint Committee elected by these commissions for investigation of technical and financial aspects of the matter. Paper, abridged, contributed to World Power Conference.

Wave. Wave-Power Transmission, E. A. Barclay-Smith. Lond., Edinburgh & Dublin Philosophica Mag. & Jl. of Sci., vol. 48, no. 283, July 1924, pp. 97–109, 9 figs. Discusses phenomena occurring in wave-power transmission through liquids in Constantinesco system.

PRESSES

Power. Automatic Power Presses. Machy. (Lond.), vol. 24, no. 618, July 31, 1924, pp. 545–550, 11 figs. Details of exhibit at Wembley of stagger presses for blanking and drawing from sheet stock at one stroke of press ram, incorporating Berry patent single-action deep-draw mechanism, automatic hinge press, etc.

PROFIT SHARING

France. Profit-Sharing and Recent French Legislation, P. Pic. Int. Labour Rev., vol. 10, no. 1, July 1924, pp. 1–29. Discusses act passed by French Parliament in 1922 for joint stock companies with profit-sharing schemes, and reluctance in its application.

PULLEYS

Cone. The Calculation of Cone-Pulley Diameters, H. E. Merritt. Mech. Wld., vol. 76, no. 1961, Aug. 1, 1924, pp. 66–67. Details of calculation for crossed belts and its application to open belts by means of correction determined to high degree of accuracy by simple slide-rule calculation.

PULVERIZED COAL

Firing. Experience with Coal Dust and Combustion of Pulverized Coal (Les expériences sur les poussières de houille et la combustion du charbon pulvérisé), J. A. deGrey. Revue Universelle des Mines, vol. 2 (series 7), no. 5, June 1, 1924, pp. 276–283, 2 figs. Discusses principles of burner construction, combustion chamber, use of low-grade fuels and mixtures.

Pulverized-Coal Firing in a Billet Reheating Furnace (Le chauffage au charbon pulvérizé d'un four poussant à billettes). Génie Civil, vol. 84, no. 26, June 28, 1924, pp. 621–623, 3 figs. Details of reconstructing furnace for reheating billets before rolling which were formerly fired with half-gas, difficulties met with, and advantages of new system.

Plants. Self Contained Pulverized Coal Unit, C. H. Tupholme. Power Plant Eng., vol. 28, no. 15, Aug. 1, 1924, pp. 800–801, 2 figs. Describes British development which crushes, separates, dries and delivers pulverized coal to furnace. Requires no auxiliary plant except means for rotating its spindle and provision of a supply of raw coal to hopper; low first cost and compactness; permits low-grade fuels to be burned economically.

PUMPING STATIONS

Diesel-Driven. Large Paris Pumping Plants are Diesel-Driven. Oil Engine Power, vol. 2, no. 7, July 1924, pp. 388–390, 3 figs. Gives illustrations and account of one of large oil-engined pumping plants of Paris, fitted with two 4-cylinder, 4-cycle engines belt-connected to Rateau double-suction centrifugal pumps.

PUMPS

Air-Lift. Experimental Study of Air Lift Pumps and Application of Results to Design, C. N. Ward and L. H. Kessler. Univ. of Wis.—Bul., vol. 9, no. 4, serial no. 1265, 1924, 166 pp., 60 figs. Results of experiments as to footpieces show that conditions of eduction pipe, where energy of air is expended in producing motion of water, are factors determining success or failure.

British Empire Exhibition. British Empire Exhibition: Pumps and Pumping Machinery. Engineering, vol. 118, no. 3053, July 4, 1924, pp. 2–5, 20 figs. partly on supp. plates. Describes high-lift turbine pumps, emergency bilge pump, and low-lift turbine pump for submerged working exhibited by Gwynnes Eng. Co., Ltd., Hammersmith; duplex pump with Twells valve gear, vertical piston cooling pump, and duplex steam pump, of Hayward-Tyler & Co., Ltd.; and opposed-impeller extraction pump, low-lift condensate pump, and multi-stage high-lift pump, of Mirrlees Watson Co., Ltd.

Humphrey Gas Pump. The Humphrey Gas Pump. Can. Engr., vol. 47, no. 7, Aug. 12, 1924, pp. 243–244, 2 figs. Internal-combustion engine used for pumping water; explosion of gas forces water through pipe.

Testing. The Comparison of Pump Tests with Special Reference to Low Head Pumps, E. F. Delery. Louisiana Eng. Soc.—Proc., vol. 10, no. 2, Apr. 1924, pp. 98–107. Lays stress on capacity and spouting velocity as related to lift in selecting or designing pumps; gives pratical examples of determining efficiency.

Vacuum. Determining the Type of Vacuum Pump for Given Air Removal Conditions, C. M. Reed. Power, vol. 60, no. 2, July 8, 1924, pp. 52–54, 4 figs. Discusses rotative dry-vacuum pump and steam-jet pumps, and gives charts for simplified calculation of relative volumes and weights of dry air in air-steam mixtures.

PUMPS, CENTRIFUGAL

Lubrication. Oil System Specially Designed for Municipal Pumping Plant, H. R. Cady. Power, vol. 60, no. 6, Aug. 5, 1924, pp. 203–205, 3 figs. Tells why continuity of service is highly important and how low renewal cost is obtained. Gravity tank provides 15-min. supply without pump, and indicating devices check operation.

PUNCHES

Dies and, Standard Sets. Standard Punch and Die Sets, S. Diamant. Am. Mach., vol. 61., no. 5, July 31, 1924, pp. 199–201, 3 figs. Various types and advantages. Time and original cost saved by standard equipment. Abstract of paper for Metropolitan Sec. A.S.M.E., Apr. 15, 1924.

PYROMETRY

Thermoelectric. The Principles of Applications of Thermoelectric Pyrometry, L. B. Haney. Australasian Inst. Min. & Met.—Proc., no. 52, Dec. 31, 1923, pp. 185–206, 7 figs. Discusses developments, thermocouples, cold end of couples, protection and repairs of couples; methods of standardization of couples and instruments, etc.

R

RADIATORS

Ammonia, Cast-Iron, Heat Transfer in. Heat Transfer in Cast-Iron Radiator Sections for Ammonia, H. J. Macintyre. Ice & Refrigeration, vol. 67, no. 1, July 1924, pp. 42–43, 4 figs. Results of tests showing that cast iron may be made suitable for use on low-pressure side of ammonia cycle. Paper presented at west. meeting, Am. Soc. Refrig. Engrs.

Sizes, Calculation of. A Speedy and Accurate Method of Figuring Radiator Sizes, P. R. Babcock. Heat. & Vent. Mag., vol. 21, no. 7, July 1924, pp. 53–54, 2 figs. Gives formulas and methods.

RAILS

Corrugation. How Rail Corrugation Has Been Eliminated in Pittsburgh, I. E. Church. Elec. Ry. Jl., vol. 64, no. 3, July 19, 1924, pp. 83–85. Results of investigations made of circumstances under which in past corrugation developed and track structure was designed to prevent its recurrence.

Life of. Securing the Maximum Life of Rail in Track, B. M. Cheney. Eng. & Contracting (Railways), vol. 62, no. 1, July 16, 1924, pp. 129–133. Average age of rail varied from 5.6 to 13.6 yr.; gives factors that determine length of service.

Treated and Untreated. Mill Treatment Doubles the Life of Rail. Elec. Ry. Jl., vol. 64, no. 4, July 26, 1924, pp. 123–125, 1 fig. Service tests made by Boston Elevated Ry. show wear on Sandberg sorbitic rail to be only about one-half that on untreated rail in same track; cost of treated rail is slightly higher.

RAILWAY ELECTRIFICATION

British Empire Exhibition. First World Power Conference. Ry. Gaz., vol. 41, no. 4, July 25, 1924, pp. 121–124, 2 figs. Abstracts of papers on electrification of railways read at British Empire Exhibition. Electric Traction in Italy, F. Tajani; Electrification of Railways in Norway, H. J. Schreiner; Power problems of Sweden Railways, I. Ofverholm.

France. Electrification of Suburban Lines to the West of Paris (L'électrification des lignes de la banlieue Ouest de Paris). Industrie des Tramways, Chemins de Fer, et Transports Publics Automobiles, vol. 18, no. 210, June 1924, pp. 184–190, 12 figs. Details of electrification of state railways; permanent way, rolling stock, electric equipment.

Switzerland. Present Status of Railway Electrification of the Federal Swiss Railroad (L'État actuel de l'électrification des Chemins de fer fédéraux suisses. Génie Civil, vol. 84, no. 26, June 28, 1924, pp. 609–614, 7 figs. Also Elec. Ry. & Tramway Jl., vol. 50, no. 1242, June 13, 1924, pp. 273–277, 6 figs. Progress in electrification; working current, single-phase 15,000-volt, 16⅔ periods, generated in hydroelectric power stations; 525 out of 2900 km. are now electrified.

RAILWAY MANAGEMENT

Accounting. The New Problems of the Accounting Officer, A. J. County. Ry. Age, vol. 77, no. 3, July 19, 1924, pp. 109–112. Reduction in statistical requirements and simplification offer greatest opportunity for study. Address before Ry. Accounting Officers' Assn. annual mtg.

RAILWAY MOTOR CARS

Diesel-Electric. Modern Railway Motor Car (Moderne Triebwagen), M. Rintelen. Fördertechnik u. Frachtverkehr, vol. 17, no. 12, June 18, 1924, pp. 161–162. Discusses Diesel-electric cars and new speed gears of A. E. G.

France. Traction on Rail Tracks by Means of Liquid-Fuel Engines (La Traction sur voi ferrée par moteurs a combustibles liquides), E. Brillié. Société d'Encouragement pour l'Industrie Nationale—Bul., vol. 136, no. 3, Mar. 1924, pp. 217–278, 145 figs. Describes construction of Diesel engines, etc., types of transmission and their efficiency; gives illustrations and details of large number of engines for locomotives, railway motor cars, locotractors, etc.

Gasoline. Petrol Rail Car Development. Tramway & Ry. Wld., vol. 55, no. 30, June 19, 1924, pp. 290–293, 8 figs. Describes Brill model no. 55 gasoline rail car; overall length 43 ft. 5 in., width over posts 8 ft. 4 in., height from rail to top of roof 10 ft. 5 in., passenger compartment seats 46; engine is four-cylinder, four-cycle, heavy-duty type, developing 41.8 hp. at 800 r.p.m.

Two Unit Gasoline Motor Train. Ry. & Locomotive Eng., vol. 37, no. 7, July 1924, pp. 195–196, 2 figs. Maryland and Delaware Coast Ry. equipping entire system with gasoline motor coaches and freight trucks. First to be put in operation between Queenstown, Md. and Lewes, Del. is two-car all-steel train consisting of motor trailer built by Four Wheel Drive Auto Co.

Improvements. Improvements in Motor Car Design, H. Dubath. Elec. Ry. Jl., vol. 64, no. 7, Aug. 16, 1924, pp. 251–253. Trends in design of electric-railway rolling stock considered from standpoints of first cost and maintenance; bodies, running gear, ball and roller bearings, brakes and other parts discussed. Abstract of paper read before Union Internationale de Tramways, de Chemins de fer d'Inêtèrt local et de Transports Publics Automobiles.

RAILWAY OPERATION

Cost Control. Cost Control for the Mechanical Department, G. W. Armstrong. Ry. Mech. Engr., vol. 98, no. 8, Aug. 1924, pp. 459–463, 2 figs. Cost knowledge and production control bring about improvement in railroad operating costs.

Hot-Box Prevention. Maintenance the Key to Hot Box Prevention, M. S. Roberts. Ry. Mech. Engr., vol. 98, no. 8, Aug. 1924, pp. 474–476, 4 figs. Discusses hot-box prevention, regular inspection of journals, bearings, boxes, wedges, etc.

Train Control. I. C. C. Modifies Train Control Order. Ry. Signaling, vol. 17, no. 8, Aug. 1924, pp. 304–308. New roads in second order exempted, permissive feature of train stop re-inserted in specifications.

New Design of Brookins Train Control. Ry. Elec. Engr., vol. 15, no. 8, Aug. 1924, pp. 257–260, 7 figs. Featuring normally raised descending-type shoe and flexible brush contact, Brookins Ry. Corp.

Train Despatching. Modern Methods in Train Dispatching, J. C. Latham. Elec. Communication, vol. 3, no. 1, July 1924, pp. 57–68, 13 figs. Describes Western Electric selector, consisting of a simple electromagnetically operated stepping mechanism which permits calling of any station without affecting others; portable telephones supplied to crews of passenger and freight trains; describes selector train-despatching system on railroads in different parts of world.

Train Loads, Maximum. Maximum Train Loads. Ry. Rev., vol. 75, no. 6, Aug. 9, 1924, pp. 205–209. Report of committee for purpose of establishing quick and practicable method of adjusting tonnage ratings for various locomotives under different conditions of grade and alignment.

RAILWAY REPAIR SHOPS

Driving-Rod Repairs. Modern Practice in Driving Rod Repairs. Ry. Rev., vol. 75, no. 7, Aug. 16, 1924, pp. 236–244, 23 figs. Describes methods employed in various shops for manufacturing new rods, using some of the more modern machines, in connection with other practices followed in repairing driving rods; installations of modern shop equipment tend to simplify maintenance operations.

Turbo-Generator Repairs. Headlight Maintenance on the Nickel Plate, H. A. Leatherman. Ry. Elec. Engr., vol. 15, no. 7, July 1924, pp. 217–218, 5 figs. Describes methods of repairing all turbo-generator work for two divisions of average length done at Stony Island shops of New York, Chicago & St. Louis, Ry.

RAILWAY SHOPS

Delivery of Material. Store Delivery of Material to Users at Shops, J. E. Peery. Ry. Rev., vol. 75, no. 5, Aug. 2, 1924, pp. 155–159, 5 figs. Results obtained on Southern Pacific system indicate possibilities of substantial savings through this service.

Design. Design of Shops and Locomotive Terminals Committee's Report. Can. Ry. & Mar. Wld., no. 317, July 1924, pp. 326–327. Report of Am. Ry. Assn. committee recommended practice.

Layout. Some Questions in Modern Shop Design, E. Wanamaker. Ry. Mech. Engr., vol. 98, no. 8, Aug. 1924, pp. 486–488. Flexibility of arrangement with view to probable future expansion is important consideration.

Locomotive. Locomotive Shops Reconstructed on D. & R. G. W. Ry. Mech. Engr., vol. 98, no. 8, Aug. 1924, pp. 491–496, 9 figs. Program includes additions to general repair plants at Denver and Salt Lake City.

Scrap Reclamation. The Disposition of Discarded Material, H. C. Stevens. Ry. Rev., vol. 75, no. 3, July 19, 1924, pp. 87–91, 17 figs. Discusses possibilities in reclamation of various items of scrap by installation of modern labor-saving devices, together with possible savings, if importance of conserva-

Manufactured by Advertisers — CLASSIFIED LIST OF MECHANICAL EQUIPMENT — Alphabetical List on page 156

Steel, Cold Drawn
Union Drawn Steel Co.

Steel, Cold Rolled
Cumberland Steel Co.
Union Drawn Steel Co.

Steel, Hot Rolled
Central Steel Co.

Steel, Molybdenum
Central Steel Co.

Steel, Nickel
Central Steel Co.
Union Drawn Steel Co.

Steel, Open-Hearth
* Falk Corporation
Union Drawn Steel Co.

Steel, Rock Drill
* Ingersoll-Rand Co.

Steel, Screw, Cold Drawn
Union Drawn Steel Co.

Steel, Spring
Central Steel Co.

Steel, Strip (Cold Rolled)
Driver-Harris Co.

Steel, Tool
Cann & Saul Steel Co.

Steel, Vanadium
Central Steel Co.
Union Drawn Steel Co.

Steel Plate Construction
Bethlehem Shipbldg.Corp'n(Ltd.)
* Bigelow Co.
* Burhorn, Edwin Co.
* Casey-Hedges Co.
* Cole, R. D. Mfg. Co.
* Graver Corp'n
* Hendrick Mfg. Co.
* Keeler, E. Co.
Morrison Boiler Co.
Steere Engineering Co.
* Titusville Iron Works Co.
* Union Iron Works
* Vogt, Henry Machine Co.
* Walsh & Weidner Boiler Co.

Steps, Ladder & Stair (Non-Slipping)
* Irving Iron Works Co.

Stills
* Vogt, Henry Machine Co.

Stocks and Dies
* Landis Machine Co. (Inc.)

Stokers, Chain Grate
* Babcock & Wilcox Co.
* Combustion Engineering Corp'n
* Riley, Sanford Stoker Co.
* Westinghouse Electric & Mfg. Co.

Stokers, Overfeed
* Detroit Stoker Co.
* Riley, Sanford Stoker Co.
* Westinghouse Electric & Mfg. Co.

Stokers, Underfeed
* American Engineering Co.
* Combustion Engineering Corp'n
* Detroit Stoker Co.
* Riley, Sanford Stoker Co.
* Sturtevant, B. F. Co.
* Westinghouse Electric & Mfg. Co.

Strainers, Oil
* Bowser, S. F. & Co. (Inc.)
* Mason Regulator Co.

Strainers, Steam
* Foster Engineering Co.
* Kieley & Mueller (Inc.)
* Mason Regulator Co.

Strainers, Water
Elliott Co.
* Foster Engineering Co.
Golden-Anderson Valve Specialty Co.
* Kieley & Mueller (Inc.)
* Mason Regulator Co.
* Schutte & Koerting Co.

Strainers, Water (Traveling)
Link-Belt Co.

Structural Steel Work
* Hendrick Mfg. Co.
* Walsh & Weidner Boiler Co.

Sugar Machinery
Farrel Foundry & Machine Co.
* Walsh & Weidner Boiler Co.

Superheaters, Steam
* Babcock & Wilcox Co.
* Power Specialty Co.
* Superheater Co.

Superheaters, Steam (Locomotive)
* Power Specialty Co.
* Superheater Co.

Superheaters, Steam (Marine)
* Power Specialty Co.
* Superheater Co.

Switchboards
* General Electric Co.
* Westinghouse Electric & Mfg. Co.

Switches, Electric
* General Electric Co.
* Westinghouse Electric & Mfg. Co.

Synchronous Converters
(See Converters, Synchronous)

Tables, Drawing
Dietzgen, Eugene Co.
Economy Drawing Table & Mfg. Co.
Keuffel & Esser Co.
New York Blue Print Paper Co.
ParVell Laboratories
U. S. Blue Co.
Weber, F. Co. (Inc.)

Tachometers
* American Schaeffer & Budenberg Corp'n
* Bristol Co.
Veeder Mfg. Co.

Tachoscopes
* American Schaeffer & Budenberg Corp'n

Tanks, Acid
* Graver Corp'n
* Walsh & Weidner Boiler Co.

Tanks, Ice
* Frick Co. (Inc.)
* Graver Corp'n

Tanks, Oil
* Graver Corp'n
* Hendrick Mfg. Co.
Morrison Boiler Co.
* Scaife, Wm. B. & Sons Co.
* Titusville Iron Works Co.
* Walsh & Weidner Boiler Co.

Tanks, Pressure
* Graver, Corp'n
* Hendrick Mfg. Co.
* Ingersoll-Rand Co.
Morrison Boiler Co.
* Titusville Iron Works Co.
* Vogt, Henry Machine Co.
* Walsh & Weidner Boiler Co.

Tanks, Steel
Bethlehem Shipbldg.Corp'n(Ltd.)
* Bigelow Co.
* Casey-Hedges Co.
* Cole, R. D. Mfg. Co.
* Graver Corp'n
* Hendrick Mfg. Co.
Morrison Boiler Co.
* Scaife, Wm. B. & Sons Co.
* Titusville Iron Works Co.
* Union Iron Works
* Vogt, Henry Machine Co.
* Walsh & Weidner Boiler Co.

Tanks, Storage
* Cochrane Corp'n
* Cole, R. D. Mfg. Co.
* Combustion, Engineering Corp'n
* Graver Corp'n
* Hendrick Mfg. Co.
Morrison Boiler Co.
* Scaife, Wm. B. & Sons Co
* Titusville Iron Works Co.
* Vogt, Henry Machine Co.
* Walsh & Weidner Boiler Co.

Tanks, Tower
* Graver Corp'n
* Walsh & Weidner Boiler Co.

Tanks, Welded
* Cole, R. D. Mfg. Co.
* Graver Corp'n
Morrison Boiler Co.
* Scaife, Wm. B. & Sons Co.

Tap Extensions
Allen Mfg. Co.

Tapping Attachments
* Whitney Mfg. Co.

Temperature Regulators
(See Regulators, Temperature)

Testing Laboratories, Cement
* Smidth, F. L. & Co.

Textile Machinery
* Franklin Machine Co.
* Tolhurst Machine Wks

Thermometers
* American Schaeffer & Budenberg Corp'n
* Ashton Valve Co.
* Bristol Co.
* Sarco Co. (Inc.)
* Tagliabue, C. J. Mfg. Co.

Thermometers, Chemical
* Tagliabue, C. J. Mfg. Co.

Thermometers, High Range (Recording)
* Bailey Meter Co.
* Tagliabue, C. J. Mfg. Co.

Thermometers, Industrial
* Tagliabue, C. J. Mfg. Co.

Thermostats
* Bristol Co.
* Fulton Co.
* General Electric Co.

Thread Cutting Tools
* Crane Co.
* Jones & Lamson Machine Co.
* Landis Machine Co. (Inc.)

Threading Machines, Pipe
* Landis Machine Co. (Inc.)

Tie Tamping Outfits
* Ingersoll-Rand Co.

Time Recorders
* Bristol Co.

Tinsmiths' Tools and Machines
* Niagara Machine & Tool Works

Tipples, Steel
Link-Belt Co.

Tools, Brass-Working Machine
* Warner & Swasey Co.

Tools, Machinist's Small
* Atlas Ball Co.

Tools, Pneumatic
* Ingersoll-Rand Co.

Tracks, Industrial Railway
Easton Car & Construction Co.

Tracks, Overhead
Palmer-Bee Co.

Tractors
* Allis-Chalmers Mfg. Co.

Tractors, Turntable
* Whiting Corp'n

Tramrail Systems, Overhead
* Brown Hoisting Machinery Co.
Link-Belt Co.
* Whiting Corp'n

Tramways, Bridge
Link-Belt Co.

Tramways, Wire Rope
Clyde Iron Works Sales Co.
Lidgerwood Mfg. Co.
* Roebling's, John A. Sons Co.

Transfer Tables
* Whiting Corp'n

Transformers, Electric
* Allis-Chalmers Mfg. Co.
* General Electric Co.
* Westinghouse Electric & Mfg. Co.

Transmission Machinery
(See Power Transmission Machinery)

Transmissions, Automobile
* Foote Bros. Gear & Machine Co.

Transmissions, Variable Speed
* American Fluid Motors Co.
* Foote Bros. Gear & Machine Co.

Traps, Radiator
* American Radiator Co.
* Sarco Co. (Inc.)

Traps, Return
* American Blower Co.
* Crane Co.
* Kieley & Mueller (Inc.)

Traps, Steam
* American Blower Co.
* American Schaeffer & Budenberg Corp'n
* Crane Co.
Elliott Co.
Golden-Anderson Valve Specialty Co.
* Jenkins Bros.
Johns-Manville (Inc.)
* Kieley & Mueller (Inc.)
* Reading Steel Casting Co. (Inc.)
(Pratt & Cady Division)
* Sarco Co. (Inc.)
* Schutte & Koerting Co.
Squires, C. E. Co.
* Vogt, Henry Machine Co.

Traps, Vacuum
* American Blower Co.
* American Schaeffer & Budenberg Corp'n
* Crane Co.
* Sarco Co. (Inc.)

Treads
* Irving Iron Works Co.

Treads, Stair (Rubber)
* United States Rubber Co.

Trolleys
* Brown Hoisting Machine Co.
* Whiting Corp'n

Trolleys, Monorail
Palmer-Bee Co.

Tubes, Boiler, Seamless Steel
* Casey-Hedges Co.

Tubes, Condenser
* Scovill Mfg. Co.
* Wheeler Condenser & Engrg. Co

Tubes, Pitot
* American Blower Co.
Bacharach Industrial Instrument Co.

Tubing, Rubber
* Goodrich, B. F. Rubber Co.
* United States Rubber Co.

Tubing, Rubber (Hard)
* Goodrich, B. F. Rubber Co.

Tumbling Barrels
Farrel Foundry & Machine Co.
* Royersford Fdry. & Mach. Co
* Whiting Corp'n

Turbines, Hydraulic
* Allis-Chalmers Mfg. Co.
* Cramp, Wm. & Sons Ship & Engine Bldg. Co.
* Leffel, James & Co.
Newport News Shipbuilding & Dry Dock Co.
Smith, S. Morgan Co.
* Worthington Pump & Mchry. Corp'n

Turbines, Steam
* Allis-Chalmers Mfg. Co.
* Coppus Engineering Corp'n
* De Laval Steam Turbine Co.
* General Electric Co.
* Kerr Turbine Co.
Ridgway Dynamo & Engine Co.
* Sturtevant, B. F. Co.
* Terry Steam Turbine Co.
* Westinghouse Elec. & Mfg. Co.
* Wheeler Condenser & Engrg. Co.

Turbo-Blowers
* Coppus Engineering Corp'n
* General Electric Co.
* Ingersoll-Rand Co.
* Kerr Turbine Co.
* Sturtevant, B. F. Co.

Turbo-Compressors
* Ingersoll-Rand Co.

Turbo-Generators
* Allis-Chalmers Mfg. Co.
* De Laval Steam Turbine Co.
* General Electric Co.
* Kerr Turbine Co.
Ridgway Dynamo & Engine Co
* Sturtevant, B. F. Co.
* Terry Steam Turbine Co.
* Westinghouse Electric & Mfg. Co.

Turbo-Pumps
Bethlehem Shipbldg. Corp'n (Ltd)
* Coppus Engineering Corp'n
* Kerr Turbine Co.
* Terry Steam Turbine Co.
* Wheeler Condenser & Engineering Co.

Turntables
Easton Car & Construction Co.
Link-Belt Co.
Palmer-Bee Co.
* Whiting Corp'n

Turret Machines
(See Lathes, Turret)

Unions
* Crane Co.
* Edward Valve & Mfg. Co.
Lunkenheimer Co.
* Pittsburgh Valve, Fdry. & Const. Co.
* Vogt, Henry Machine Co.

Unions, Pressed Steel
Rockwood Sprinkler Co.

Unloaders, Air Compressor
* Ingersoll-Rand Co.
* Worthington Pump & Machinery Corp'n

Unloaders, Ballast
Lidgerwood Mfg. Co.

Unloaders, Car
* Gifford-Wood Co.
Link-Belt Co.

Vacuum Breakers
* Foster Engineering Co.

Vacuum Dryers, Pans, Pumps, Traps, etc.
(See Pans, Pumps, Traps, etc., Vacuum)

Valve Discs
* Edward Valve & Mfg. Co.
Garlock Packing Co.
* Goodrich, B. F. Rubber Co.
* Jenkins Bros.
* Reading Steel Casting Co. (Inc.)
(Pratt & Cady Division)
* United States Rubber Co.

*Catalogue data of firms marked * appear in the A.S.M.E. Condensed Catalogues of Mechanical Equipment, 1923-24 Volume*

tion and reclamation is recognized and conceded by placing work under supervision of aggressive, studious, mechanical man with proper material knowledge. Gives some methods employed by Wabash Ry.

RAILWAY SIGNALING

Double-Wire. The Double-Wire Working of Points and Signals. Ry. Engr., vol. 45, no. 535, Aug. 1924, pp. 283–285, 6 figs. Shows how first cost of signaling and of its subsequent maintenance may be reduced; points and signals are easier to move; signals are compensated when "on" and when "off," and they are definitely restored instead of going "on" by gravity; insures that signals do not stick "off."

Flagging. Why Continue Flagging in Automatic Territory? J. L. White. Ry. Age, vol. 77, no. 4, July 26, 1924, pp. 149–151. Shows that in automatic-signal territory continued use of flagging rule creates a divided responsibility that causes collisions; suggests that placing of responsibility squarely on engine man will to a large extent diminish rear-end collisions.

Great Britain. Railway Signalling and Its Development, A. F. Bound. Inst. of Transport—Jl., vol. 5, no. 4, Feb. 1924, pp. 168–176. Discusses block and interlocking systems; low-pressure pneumatic, electro-pneumatic, all-electric, and electromechanical and other systems.

Interlocking. N. P. Interlocking at Minneapolis, C. A. Christofferson. Ry. Signaling, vol. 17, no. 8, Aug. 1924, pp. 301–302, 7 figs. Floating charge reduces required battery capacity; locking and electric lighting circuits simplified.

New York, New Haven & Hartford. Signal Development in Connection with Single Phase Propulsion, W. F. Follett. Ry. Signaling, vol. 17, no. 8, Aug. 1924, pp. 315–319, 4 figs. Discusses alternating-current signaling to meet special characteristics caused by electric operation.

RAILWAY TIES

Forecasting Requirements for. How a Road Can Forecast Its Tie Requirements, E. Stimson. Wood Preserving News, vol. 2, no. 7, July 1924, pp. 109–112. Average life for untreated ties is 9½ yr. and 16 yr. for treated ties. Tables estimating cross-tie requirements of B. & O. for 1922 and 1923 and cross-tie renewal experience and projection for B. & O.

Treatment. Comparative Tests with Wooden Railway Ties Impregnated with Tar Oil or Basilite (Vergleichsversuche an Holzschwellen, die mit Teeröl oder Basilit getränkt sind), H. P. Maas-Geesteranus. Organ für die Fortschritte des Eisenbahnwesens, vol. 79, no. 4, Apr. 15, 1924, pp. 74–78. Results of tests with tar-oil ties and basilite ties after 10 years service show basilite to be more economical as impregnating material. It consists of 89 sodium fluorite and 11 parts dinitrophenol-aniline.

The Dhilwan Creosoting Plant, H. L. Woodhouse. Roy. Engrs. Jl., vol. 38, no. 2, June 1924, pp. 205–210. Discusses creosoting and creosoting plant of Northwestern Ry. of India, methods, costs, fire protection, etc.

RAILWAY TRACK

Stresses in. Track Stresses, C. T. Ripley. Ry. & Locomotive Eng., vol. 37, no. 7, July 1924, pp. 208–210, 2 figs. Series of stremmatograph tests made on large electric locomotives. First series of tests made on and near horseshoe curve in New Mexico on tangent track and 6-deg. and 10-deg. curves, showed that some high stresses were obtained under these locomotives, especially on 10-deg. curves

Transfer Tables. 35-Ton Electric "Surface" Transverser. Engineer, vol. 138, no. 3577, July 18, 1924, pp. 84–85, 2 figs. Describes transfer table constructed by S. H. Heywood & Co., Ltd., Reddish, Eng., for Bengal-Nagpur Ry. Co's workshops at Khargpur, for transferring rolling stock on parallel tracks.

Turntables. Turntable Renewal is Accomplished Under Difficulty, R. C. Henderson. Ry. Eng. & Maintenance, vol. 20, no. 8, Aug. 1924, pp. 300–302, 7 figs. Baltimore & Ohio Ry., Lima, Ohio, replaced 90-ft. turntable by one having length of 100 ft.

REAMERS

Taper Machine. Taper Machine Reamers, F. Cooke. Machy. (Lond.), vol. 24, no. 615, July 10, 1924, pp. 449–452, 5 figs. Motion of a reamer; positive value; natural and negative value teeth; stability from spiral teeth.

REFRACTORIES

Research Committee Report. Report of Refractory Materials Joint Research Committee. Gas. Jl., vol. 167, no. 3191, July 9, 1924, pp. 17–36 and (discussion) 36–38 (supp.), contains abstracts of following papers: Storage of Silica Refractories, W. J. Rees; Relation between Ordinary Refractoriness, Under-Load Refractoriness, and Composition, Physical and Chemical, of Refractory Material, A. J. Dale, 11 figs.; Refractoriness Under Load, J. W. Mellor, 2 figs.; Sedimentation as a Means of Purifying Clay, S. R. Hind; Effect of Repeated Burning on Structure and Properties of Lime-Bonded Silica Bricks, W. Hugill and W. J. Rees, 10 figs.; Some Causes of Variation in Sizes of Refractories—Bricks and Block, J. W. Mellor, 3 figs.; Thermal Conductivity and Some Other Properties of Two Commercial, Heat-Insulating Bricks Used in Kiln Construction, A. T. Green, 5 figs.; Influence of Texture on Transmission of Heat Through Firebricks, A. T. Green, 12 figs.

REFRIGERANTS

Methyl Chloride. A Heat Chart for Methyl Chloride, T. M. Gunn. Refrig. Wld., vol. 59, no. 7, July 1924, pp. 15–18. Advantages and properties of methyl chloride and explanation of chart; with diagram more common problems of refrigeration may be worked out almost without calculation.

Thermodynamics. Comparison of Thermodynamic Characteristics of Various Refrigerating Fluids, W. H. Carrier and R. W. Waterfill. Refrig. Eng., vol. 10, no. 12, June 1924, pp. 415–424, 12 figs. Comparison and analysis of refrigerating cycles of various fluids using ideal Carnot cycle as standard, also their adaptability for positive or centrifugal compression. Paper read before Am. Soc. Refrigerating Engrs.

REFRIGERATING MACHINES

Compression. Recent Improvements in Refrigerating Apparatus, F. Ophuls and G. A. Horne. Refrig. Eng., vol. 2, no. 1, July 1924, pp. 1–13, 8 figs. Deals with that part of ammonia-compression refrigerating system in which ammonia is transferred to compressor, from there to condenser, then to receiver and finally liquid is returned to expansion, pressure-reducing or liquid-regulating valves of system. Paper read before Fourth Int. Congress of Refrigeration.

Evaporated-Water. Refrigeration with Evaporated Water. Nautical Gaz., vol. 107, no. 3, July 19, 1924, p. 76 (tech. sec.), 3 figs. Details of new Westinghouse-Leblanc apparatus which does not require chemicals.

REFRIGERATING PLANTS

Ammonia Tables, Use of. Using the Ammonia Tables, J. E. Starr. Power, vol. 60, no. 3, July 15, 1924, pp. 91–92. Gives tables showing properties of saturated and superheated ammonia—saturated-ammonia table containing also gage pressure—and explains their use.

Ice-Cream. World's Largest Ice Cream Plant, T. Mitchell. Refrig. Wld., vol. 59, no. 7, July 1924, pp. 11–14 and 36, 15 figs. Illustrated description of Breyer Ice Cream Co.'s new plant in West Phila., Pa., equipped to make 14,000,000 gal. a year.

Research Plants. Refrigeration for Research Work, S. R. Winters. Ice & Refrigeration, vol. 67, no. 1, July 1924, pp. 14–15, 2 figs. Describes experimental refrigerating plant at Bur. Animal Industry of U. S. Dept. Agriculture, Washington, D. C.; considerations of temperatures required; description of equipment; improvement of foods due to research work.

REFRIGERATION

Fish. A Modern Fish Freezing Plant, P. W. Petersen. Refrig. Eng., vol. 10, no. 12, June 1924, pp. 425–431, 10 figs. Describes Petersen methods using brine tanks, the brine not coming in contact with the fish, however; gives results obtained.

RIFLES

Bolt Manufacture. Manufacture of the Bolt of the Springfield Rifle, E. McFarland. Mech. Eng., vol. 46, no. 8, Aug. 1924, pp. 463–470 and (discussion) 470–471, 19 figs. Methods employed in manufacture of bolt of Springfield rifle form an example of highly specialized use of tools, jigs, fixtures, and gages which is typical of gun-making industry. Describes a number of machining operations which are particularly adapted to gun manufacture, but which at same time may find some application in other lines of production. Particulars of system of gaging used.

ROLLING MILLS

Blooming Mill. Mechanical and Electrical Analyses of 40 Inch Blooming Mill Screwdown, F. D. Egan. Iron & Steel Engr., vol. 1, no. 7, July 1924, pp. 371–379, 42 figs. Electrification of 40-in. blooming mill of Lackawanna plant of Bethlehem Steel Co., replacing all steam and hydraulic drives.

Cooling Beds. Automatic Cooling Beds (Automatische Kühlbetten), H. Hilterhaus. Stahl. u. Eisen, vol. 44, no. 27, July 3, 1924, pp. 777–786, 8 figs. Discusses arrangement of cooling beds and describes various types, including the Morgan, Edwards and Teba.

Hot-Strip. A New 20-16 in. Hot Strip Mill, N. Jones and G. P. Wilson. Am. Inst. Elec. Engrs.—Jl., vol. 43, no. 8, Aug. 1924, pp. 710–715, 9 figs. Details of new plant of West Leechburg Steel Co., Pa. designed for thin strips, including outdoor substation equipment, with motors, speed regulations, etc.

ROLLS

Alloy-Steel. Producing Hardened and Ground Rolls, J. R. Adams. Abrasive Industry, vol. 5, no. 7, July 1924, pp. 168–170, 6 figs. Discusses rolls of composition C 0.70 to 1.25, Mn 0.20 to 0.40, Si 0.15 to 0.30, Cr. 1.50 to 2.50 per cent, their production in electric furnace, hardening of surfaces, grinding, and microscopic and scleroscopic and other tests.

Casting. Vertical Pouring of Rolling-Mill Rolls (La coulée en chute appliquée aux cylinders de laminoirs). Fonderie Moderne, vol. 18, June 1924, pp. 143–146, 5 figs. Used in place of bottom casting, in metal mold, with hottest part at top.

ROOFS

Sawtooth Construction. A Modern Type of Saw-Tooth Roof Construction. Am. Architect, vol. 126, no. 2449, July 2, 1924, pp. 25–29, 12 figs. Two sets of trusses are used, transverse and longitudinal. Illustrated by examples designed by Ballinger Co., Phila., Pa.

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SCREWS

Whitworth. Whitworth Screws, M. H. Sabine. Machy. (Lond.), vol. 24, no. 618, July 31, 1924, pp. 562–565, 1 fig. Details of dimensions, efficiency and other data in tabular form.

Wood. Production Data in Manufacturing Wood Screws, W. Richards. Can. Machy., vol. 31, no. 27, July 3, 1924, pp. 25 and 43, 3 figs. Description of manufacture of steel wood screws and production data for every operation. All operations performed automatically. Machines of each class arranged in batteries to facilitate work.

SEAPLANES

Development. Airmanship At Sea. Roy. Aeronautical Soc.—Jl., vol. 28, no. 163, July 1924, pp. 450–474. Discusses early development of seaplanes, their accomplishments and shortcomings, mooring-out seaplanes, etc.

SHAPERS

New Type. New 10-inch Stroke Shaping Machine. Machy. (Lond.), vol. 24, no. 615, July 10, 1924, p. 463, 3 figs. Describes machine recently constructed by Ormerods' Tool Co., Ltd., Hebden Bridge, for use in Doncaster Technical College workshop, embodying some rather unusual features introduced with specific object of increasing educational value of machine, and including in a traversing-head machine certain features usually associated with pillar type.

SPRINGS

Annular. Annular Springs (Die Ringfeder, ein neues Maschinenelement), C. Wetzel. Schweizerische Bauzeitung, vol. 84, no. 3, July 19, 1924, pp. 33–35, 3 figs. Describes new machine element, giving examples of its application and table for calculating number of springs for given load.

Coil. Coil Spring Calculations. Machy. (Lond.), vol. 24, no. 618, July 31, 1924, pp. 566–567, 3 figs. Discusses calculation of springs for measuring instruments for valves used in internal-combustion engines; gives chart for design of coil springs of circular-section wire.

Failures. Causes of Spring Failures, J. W. Rockefeller. Machy. (N. Y.), vol. 30, no. 12, Aug. 1924, pp. 965–966, 3 figs. Fatigue as a cause of failure; designing a spring to lift a dead weight; failure due to faulty material.

STANDARDIZATION

Germany. Standardisation in Germany, F. Neuhaus. Engineering, vol. 118, no. 3056, July 25, 1924, pp. 149–151. Describes in detail inauguration and work of Standards Committee of the German Industry (N. D. I.) of establishing fundamental standards, and refers briefly to several cases of special and international standardization. Paper, abridged, contributed to World Power Conference.

STEAM

High-Pressure. Extra-High Pressure Steam. Power Engr., vol. 19, no. 220, July 1924, pp. 247–250 4 figs. Study of technology and economics of new development in power plant practice, abstracted from Münzinger's recent book.

High Pressure Steam (Hochdruckdampf), O. Günther. Kraftmaschine, vol. 21, no. 12, June 25, 1924, pp. 123–124, 1 fig. Discusses direction of development, question of safety in operation, advantages of high pressure, construction of maximum-pressure boilers and turbines.

Research. Steam Research Promises Much for Power-Plant Engineers, P. W. Swain. Power, vol. 60, no. 6, Aug. 5, 1924, pp. 200–203. By Bur. of Standards, M.I.T., and Harvard for constructing and extending steam tables.

STEAM POWER PLANTS

Crossett, Ark. One New Industrial Power Plant Replaces Seven, C. B. Gorton and F. R. Innes. Power Plant Eng., vol. 28, no. 15, Aug. 1, 1924, pp. 784–791, 16 figs. Electrification of lumber mill of Crossett Lumber Co., of Crossett, Ark., necessitated scrapping 24 old boilers and an old generator. Details of equipment and materials used.

High Pressures and Superheats. High Pressures and High Superheats, W. G. Noack. Brown Boveri Rev., vol. 11, nos. 2 and 3, Feb. and Mar. 1924, pp. 23–30 and 54–63, 22 figs. Their evolution and application in steam power plants. Possible improvement of efficiency of ideal steam engine by increasing initial pressure and temperature; regenerative feedwater heating with steam bled from intermediate stages of turbine; turbines for high pressures and superheats; governing; steam generators and accessories for high pressures.

STEAM TURBINES

Auxiliaries, Motor Drives for. Motor Drives for Turbine Auxiliaries, H. W. Smith. Power Plant Eng., vol. 28, no. 15, Aug. 1, 1924, pp. 807–810, 5 figs. Modern practice in application and control of motors for auxiliary drives.

Characteristic Curves. Characteristic Curves of Steam Turbines, J. Y. Dahlstrand. Power Plant Eng., vol. 28, no. 15, Aug. 1, 1924, pp. 797–799, 7 figs. Understanding of fundamentals and factory test curves will enable one to figure effects of changed operating conditions.

Disks, Axial-Vibration Prevention. The Protection of Steam-Turbine Disks from Axial Vibration. Power, vol. 60, no. 3, July 15, 1924, pp. 94–99, 13 figs. Abstract of paper by W. Campbell presented at spring meeting of A.S.M.E., Cleveland, O., May 26–29, 1924, giving details of investigation made by Gen. Elec. Co. to account for turbine-wheel failures of a peculiar and erratic nature, which could not be explained on basis of stress alone. Essential cause was found to be fatigue resulting from disk vibration whose period corresponded closely to turbine operating speed.

High-Pressure. New High Pressure Turbine. Pac. Mar. Rev., vol. 21, no. 7, July 1924, pp. 384–385, 5 figs. Describes new velocity stage turbine developed by DeLaval Steam Turbine Co., Trenton, N. J., especially adapted to modern practice in high-pressure, high-temperature steam.

Marine. See MARINE STEAM TURBINES.

Manufactured by Advertisers

CLASSIFIED LIST OF MECHANICAL EQUIPMENT

Alphabetical List on page 156

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(See Rope, Wire)

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*Catalogue data of firms marked * appear in the A.S.M.E. Condensed Catalogues of Mechanical Equipment, 1923-24 Volume*

STEEL

Automobile. Stainless Steel for Automobiles. Automobile Engr., vol. 14, no. 191, July 1924, pp. 201–202, 1 fig. Discusses properties, heat treatment, advantages and disadvantages of stainless steel.

Chrome. See CHROME STEEL.

Chrome-Nickel. See CHROME-NICKEL STEEL.

Cold-Rolled Strip. Production of Cold Rolled Strip Steel, M. Farmer. Forging—Stamping—Heat Treating, vol. 10, no. 8, Aug. 1924, pp. 295–297. Discusses casting temperatures, segregation of elements, rolling of ingots and billets, high-speed rolling of billets and cold-rolling operations. Paper presented at Am. Soc. for Steel Treating.

Cold-Worked, Crystal Deformation in. Crystal Deformation in Cold-Worked Steel, H. H. Lester. Army Ordnance, vol. 5, no. 25, July-Aug. 1924, pp. 455–458, 44 figs. Preliminary study of behavior of atoms within iron crystal as it occurs in steel when metal is stressed up to and beyond elastic limit and up to and beyond yield point.

Plates, Corrosion-Resistance Tests. Tests Steel Plates of Leviathan, G. B. Waterhouse. Iron Trade Rev., vol. 75, no. 4, July 24, 1924, pp. 29–230, 8 figs. Chemical and physical tests made by author on samples of original German plates and English plates which had been installed in 1919 fail to show clearly why German steel resisted corrosion more successfully during 10 years of service than other steel in 5 years. Copper present and banded structure may explain resistance.

Iron Alloys. See IRON ALLOYS.

Pressed. Redevelopment in Pressed Steel Practice, M. R. Innes. Forging—Stamping—Heat Treating, vol. 10, no. 7, July 1924, pp. 262–264, 6 figs. Pressed metal has many advantages over other methods of production, but common sense must prevent detrimental effect caused by making wild claims.

Tests. What is Steel? A. Sauveur. Am. Inst. Min. & Met. Engrs.—Trans., Advance paper No. 1338-S, May 1924, 22 pp., 15 figs. Results of experiments conducted in Metallurgical Laboratory of Harvard University, in which twisting and tensile stresses were applied to iron and steel bars heated at middle to predetermined temperatures, temperature falling gradually toward both ends of bars.

STEEL CASTINGS

Cleaning. Cleaning Steel Castings Economically. Abrasive Industry, vol. 5, no. 8, Aug. 1924, pp. 198–200, 6 figs. Describes cleaning-room operations, consisting of sandblasting, tumbling, removing gates and risers, grinding, chipping, polishing, and inspecting, of Ohio Steel Foundry Co., Springfield, O.

Design. Designing Steel Castings, E. R. Young. Machy. (Lond.), vol. 24, nos. 616 and 617, July 17 and 24, 1924, pp. 501–503 and 538–540, 8 figs. Discusses pattern design, shrinkage, rib design, size and shape of castings, finish allowances, problems encountered.

Valves. Valve Castings Made in Steel, P. Dwyer. Foundry, vol. 52, no. 15, Aug. 1, 1924, pp. 579–583 and 605, 8 figs. Various component parts of valves for most every purpose beyond capacity of cast iron are poured from steel melted in electric furnace.

STEEL, HEAT TREATMENT OF

Cast Steel. Heat-Treatment of Steel with Special Reference to Production, J. W. Urquhart. Machy. (Lond.), vol. 24, no. 616, July 17, 1924, pp. 497–499. Discusses steel castings, their heat treatment, annealing and its effects, correct furnace design, cracked castings.

Motor-Truck Parts. System as Applied to the Control of Furnace Temperatures and Heat Treatment of Automobile Truck Parts, J. Sorenson. Am. Soc. for Steel Treating—Trans., vol. 6, no. 1, July 1924, pp. 77–83, 1 fig. Discusses adequate control system in inspecting raw materials and subsequent heat treatment of parts; accurate heat treatment, laboratory control in receiving of material and inspection of final product.

Problems in. Problems of the Heat Treater as Influenced by the Pre-Natal History of the Material, P. E. McKinney. Am. Soc. for Steel Treating—Trans., vol. 6, no. 1, July 1924, pp. 51–65, 14 figs. Discusses melting and refining processes and suggests (1) classification of material based on character of service for which intended, without regard to composition, (2) establishment of recommended practices for production of ingot material, similar to heat treatment, (3) development of methods for testing which will detect inherent defects.

STEEL WORKS

Calcutta, India. Blast Furnace Plant at Asansol, India. Iron Age, vol. 114, no. 5, July 31, 1924, pp. 254–256, 5 figs. Also Iron Trade Rev., vol. 75, no. 5, July 31, 1924, pp. 294–296, 4 figs. Two stacks with coke plant and auxiliaries of development of Indian Iron & Steel, Co. near Calcutta.

STREET RAILWAYS

Cars, One-Man. A New Idea in One-Man Operation. Elec. Traction, vol. 20, no. 7, July 1924, pp. 293–295, 3 figs. Washington Ry. & Elec. Co. develops automatic step treadle for rear exit operation to gain stamp of public approval for one-man car.

London, England. Latest Developments on London's Street Car System. Elec. Traction, vol. 20, no. 7, July 1924, pp. 297–301, 5 figs. Cars are of double-deck type with covered roof, seating 78 passengers; describes Charlton car shops, blacksmith shop, wheel shop, magnetic brake shoes, machine and truck shop and Greenwich power station.

Trolley Bus, Motor Bus, and. The Operation of Tramways, Trolley Omnibuses and Motor Omnibuses. Tramway & Ry. Wld., vol. 55, no. 30, June 19, 1924, pp. 307–308. Gives experience, and advantages and disadvantages of each system in Birmingham.

Trolley Derailments. Trolley Derail Prevents Accidents, O. S. Lamb. Elec. Traction, vol. 20, no. 7, July 1924, p. 323, 2 figs. Kansas City, Kaw Valley & West. Ry. have constructed device which works in conjunction with order board, making it impossible for trainmen to proceed in disregard of orders.

STRUCTURES

Effect of Wind on. Modern Ideas on Wind Force and Roof Truss Design, A. Tomlinson. Commonwealth Engr., vol. 11, no. 10, May 1, 1924, pp. 398–401, 1 fig. Discusses ordinary theory of wind pressure on roof, modern theory of wind pressure and result of investigations. Abstract of paper read before Instn. Engrs., Australia.

SUPERPOWER

Fuel Economy through. Fuel Economy through Interconnection, N. G. Reinicker. Engrs. & Engr., vol. 41, no. 4, Apr. 1924, pp. 97–99. Paper read at conference on Ecotiomy in the Use of Fuel, held at Engrs. Club of Phila., Jan. 15, 1924.

SUPERPOWER

Northeast United States, Survey of. Northeast Superpower Studies Completed. Power, vol. 60, no. 5, July 29, 1924, pp. 179–182, 6 figs. Also Eng. Wld., vol. 25, no. 2, Aug. 1924, pp. 77–79, 1 fig. Abstract of report covering present and future power requirements of the ten northeastern states and part of Ohio, Virginia and West Virginia, with special reference to cost of delivering hydroelectric power. Report indicates growth in use of electrical power for industrial and other purposes; recommends extension of interconnection between different systems, construction of large steam plants strategically located, and development of large hydroelectric projects. See also Engineers' Committee Report on Northeastern Super-Power, Eng. News-Rec., vol. 93, no. 5, July 31, 1924, pp. 186–188, 3 figs., giving comparative costs of power through combination of different sources.

T

TEMPERATURE CONTROL

Methods. Accurate Temperature Control System, S. R. Winters. Ice & Refrigeration, vol. 67, no. 1, July 1924, pp. 10–13, 4 figs. Methods employed at Bur. of Animal Industry, U. S. Dept. Agriculture, for maintaining temperatures with accuracy of 0.1 deg. cent.; refrigerating equipment and control system.

TESTING MACHINES

Tensile-Strength. Calibration of Tensile Strength Testing Machines by Means of Test Bars (Tarage des machines de traction au moyen d'éprouvettes), M. P. Nicolau. Revue de Métallurgie, vol. 21, no. 6, June 1924, pp. 342–346. Describes new method and shows its advantages compared with older methods.

TEXTILES

Water Absorption. The Thermodynamics of Water Absorption by Textile Materials, S. A. Shorter. Textile Inst.—Jl., vol. 15, no. 6, June 1924, pp. T328–T336, 3 figs. Discusses evolution of heat by absorption of water in liquid form by textile materials and criticizes some papers on subject.

TIRES, RUBBER

Molds, Manufacture of. Machine Shops Problems in Making Tire Molds, H. P. Armson. Can. Machy., vol. 32, no. 2, July 10, 1924, pp. 19–21 and 39, 5 figs. Also Can. Foundryman, vol. 15, No. 7, July 1924, pp. 22–24 and 34, 4 Figs. Turning molds to shape; engraving tread designs. Features of production at Toronto plant of Potts Pattern and Machine Co.

TOOLS

Storage. A Practical System of Tool Storage and Control, F. A. Pope. Factory, vol. 33, no. 2, Aug. 1924, pp. 208–211, 8 figs. Shows how centralized storage, flexible shelving, mechanical handling equipment and systematic grouping of tools have in one shop given clean-cut but economical control over tools.

TRACTORS

Corps. The New Corps Tractor. Army Ordnance, vol. 5, no. 25, July-Aug. 1924, pp. 443–445, 5 figs. Experimental corps tractor delivered to Aberdene Proving Ground for test was designed and built to meet requirements of Caliber Board; tracklaying vehicle, using conventional type of track; gives general specifications.

Roadless Transport. Roadless Traction Progress. Motor Transport (Lond.), vol. 38, no. 1002, May 12, 1924, pp. 591–592, 3 figs. Details of new half-track creeper machine adapted to 1-ton chassis made by Roadless Traction, Ltd., Hounslow.

Roadless Transport. Motor Transport (Lond.), vol. 38, no. 1002, May 12, 1924, pp. 586–589, 9 figs. Details of Pavesi, Holt, Kegresse, and other tractors capable of traveling over very rough ground.

TRAFFIC

Congestion Relief. City Planning and Traffic Congestion. Elec. Traction, vol. 20, no. 7, July 1924, pp. 303–307. Discusses relation which building construction and street layout bear to problem of traffic congestion; economic causes of and cures for modern bedlam in city streets.

TUBES

Seamless Steel. Manufacture of Seamless Steel Tubing, W. C. Chancellor. Engrs.' Soc. West. Pa.—Proc., vol. 40, no. 6, July 1924, pp. 217–248, 36 figs. Details of rotary piercing process as distinct from cupping process and hydraulic piercing of solid slugs, and equipment used at Ellwood City Works of Nat. Tube Co.

V

VARNISHES

Automobile. Some Attempts to Obtain More Durable Automobile Finishes, H. C. Mougey. Paint Manufacturers' Assn. of U. S., Sci. Sec., Circular no. 207, July 1924, 36–46, 5 figs. Discusses black baking-enamel system and color-rubbing and finishing varnish system, cellulose nitrate materials, and tests carried out.

The New Pyroxylin Automobile Finish, S. D. Kirkpatrick. Chem. & Met. Eng., vol. 31, no. 5, Aug. 4, 1924, pp. 178–182, 11 figs. Describes air-drying finish as durable as enamel and of sufficiently low viscosity to be applied with pneumatic spray; a hard, glass-like surface applied at minimum cost of labor, time and equipment.

Properties. Varnish Studies, W. T. Pearce. Indus. & Eng. Chem., vol. 16, no. 7, July 1924, pp. 681–684, 2 figs. Studies tabular data obtained from tests to ascertain value of laboratory tests and chemical analyses in determining durability of varnishes.

Tung-Oil. The Alkali Increase Test for Tung Oil Varnishes, H. A. Gradner and C. P. Holdt. Paint Manufacturers' Assn. of U. S., Sci. Sec., Circular no. 206, June 1924, pp. 25–34. Discusses application of alkali increase test to commercial varnishes, and accuracy of these tests.

VENTILATION

Buildings. Ventilating Buildings on the Economizer Plan, T. N. Thomson. Plumbers Trade Jl., vol. 77, no. 2, July 15, 1924, pp. 140–144, 3 figs. Study of new method of ventilating buildings both winter and summer, using heat economies to cut down cost of ventilation.

W

WASTE HEAT

Recovery. On the Recovery of Waste Heat from Open-Hearth Furnaces by the Use of Waste Heat Boilers, T. B. Mackenzie. West of Scotland Iron & Steel Inst.—Jl., vol. 31, parts 6 & 7, Mar.-Apr. 1923–1924, pp. 90–109. Discusses heat losses in open-hearth furnaces, application of waste-heat boilers, experience in operating, savings from waste-heat boilers; discussion; bibliography.

Utilization. The Reciprocal Utilisation of Waste Energy, B. M. Gerbel. Engineering, vol. 118, no. 3054, July 11, 1924, pp. 75–76. Discusses coöperation of different plants for purpose of utmost joint utilization or their fuel, besides combination between works of different power and steam requirements. Abstract of paper read before World Power Conference.

WATER POWER

Norway. The White Coal of Norway. Electrician, vol. 93, no. 2407, July 4, 1924, pp. 8–11, 6 figs. Surveys Norway's water power, relation of state to its utilization, and gives details of power stations.

Sweden. Sweden's Water Power. Electrician, vol. 93, no. 2408, July 11, 1924, pp. 39–42, 4 figs. Deals with general electri ity supply in Sweden and steps which have been taken by State to control and employ large amount of power that is available; describes various hydroelectric stations owned and operated by state and gives general power situation.

WIRE ROPE

Care of. The Wear and the Care of Wire Rope, W. Constable. Am. Contractor, vol. 45, no. 25, June 21, 1924, pp. 25–27, 9 figs. Explains right and wrong uses of wire rope and practices conducive to longevity are suggested. Paper read before meeting of Lake Superior Min. Inst.

Economical Application of. Wire Ropes, T. A. Taylor. Can. Min. Jl., vol. 45, no. 27, July 4, 1924, pp. 643–647, 8 figs. Principles governing economical application of steel-wire mining ropes both for winding and haulage purposes. Various types of ropes available and state of development to which each of these have been brought; reason for choice of most suitable rope under given circumstances; safety factor obtainable.

WOOD PRESERVATION

Treatment. Wood Preservation. Am. Ry. Eng. Assn.—Bul., vol. 25, no. 265, Mar. 1924, pp. 845–1066, 67 figs. Report of committee giving creosote specifications, service test records, marine piling research, preservative treatment for signal trunking and capping, creosote mixture with other oils, zinc-petroleum mixture; also report of sub-committee on marine piling investigations.

WORLD POWER CONFERENCE

Proceedings. Proceedings of the First World Power Conference. Engineering, vol. 118, nos. 3053, 3054, 3055 and 3056, July 4, 11, 18 and 25, 1924, pp. 18–20, 35–47, 77–87 and 115–124, 3 figs. Abstracts of papers presented and discussions which took place at Conference, held June 30 to July 12, 1924.

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*Catalogue data of firms marked * appear in the A.S.M.E. Condensed Catalogues of Mechanical Equipment, 1923-24 Volume*

THE ENGINEERING INDEX

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THE ENGINEERING INDEX presents each month, in conveniently classified form, items descriptive of the articles appearing in the current issues of the world's engineering and scientific press of particular interest to mechanical engineers. At the end of the year the monthly installments are combined along with items dealing with civil, electrical, mining and other branches of engineering, and published in book form, this annual volume having regularly appeared since 1906. In the preparation of the Index by the engineering staff of The American Society of Mechanical Engineers some 1200 technical publications received by the Engineering Societies Library (New York) are regularly reviewed, thus bringing the great resources of that library to the entire engineering profession.

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(See also page 630 of this issue for supplementary items.)

ACCIDENT PREVENTION

Industrial. Prevention of Accidents. Maschinenbau, vol. 3, no. 22, Aug. 28, 1924. Contains following articles: Accident Prevention on Presses, W. leVrang, pp. 795–799; Accident Prevention on Eccentric Presses, R. Wittlinger, pp. 799–801, 7 figs.; Safety of Protective Screens, G. Weber, pp. 801–802; Accident Prevention in Wood Industry, W. Wiedemann, pp. 802–804, 5 figs.; Welding of Iron Containers of Flammable Liquids, M. Fischer, pp. 804–806, 1 fig.; Organization Work of Machinery Industry for Accident Prevention, J. Free, pp. 819–821, 3 figs.; Progress in Accident Prevention in Machine Shops, J. Bleick, pp. 822–823; Activity of Technical Committee in Breslau, M. Schindler, pp. 823–826; and Accident Prevention and Labor, H. Gottschalk, pp. 826–829. (In German.)

AIR COMPRESSORS

Centrifugal. Centrifugal Compressors with Steam and Electric Drive (Kreiselverdichter mit Dampf- und elektrischem Antrieb), E. Blau. Technische Blätter, vol. 14, no. 29, July 19, 1924, pp. 217–218. Discusses construction of compressors and parts; pressure-volume curves of performance; steam driving by turbines and electric driving, and their advantages.

Development for Track Work. Development of the Air Compressor for Track Work and the Uses to Which It Can Be Put, W. F. Nichols. Compressed Air Mag., vol. 29, no. 9, Sept. 1924, pp. 993–994, 6 figs. Describes 4-tool, 8-tool and 12-tool machines for tamping ties, drilling holes for bond wires, running up track nuts on new rail, etc. Abstract of paper read before Int. Track Supervisors' Club, Buffalo, N. Y.

Heating, Prevention of. Prevention of Air Compressor Heating, R. A. Cultra. Power Plant Eng., vol. 28, no. 18, Sept. 15, 1924, pp. 965–967, 4 figs. Dust drawn in with air mixes with oil and causes valves to stick, resulting in heating and loss of efficiency.

Portable. The "Broomaster" Portable Air Compressor. Engineering, vol. 118, no. 3057, Aug. 1, 1924, p. 179, 1 fig. Shown at Wembley exposition by Broom and Wade, Ltd.; engine and compressor, having two cylinders each, combined in a single unit.

AIR CONDITIONING

Drying. Adjustment of Air to Certain Degrees of Dryness or Moisture by Means of Salts, etc., and the "Relative Drying Capacity" of the Substances as a Measure of Their Hygroscopicity (Die Einstellung von Luft auf bestimmte Trocknungs oder Feuchungsgrade mit Hilfe von Salzen und ähnlichen Stoffen, und das "relative Trocknungsvermögen" der Stoffe als Mass ihrer Hygroskopie), J. Obermiller. Zeit. für Physikalische Chemie, vol. 109, no. 3–4, May 5, 1924, pp. 145–164.

AIRPLANE ENGINES

Compression in. Results of Experiments on the Increase of Compression in Airplane Engines (Résultats d'expérience sur l'augmentation de la compression dans les moteurs d'aviation), P. Dumanois. Académie des Sciences—Comptes rendus des séances, vol. 178, no. 27, June 30, 1924, pp. 2236–2238. Confirmation of theory as to advisability of very high compression by using non-detonating fuel, like benzol, which does not detonate with oil.

Farman. The Farman F. 62. Flight, vol. 16, no. 34, Aug. 21, 1924, pp. 523–524, 2 figs. Describes Farman aero engine, type 12 WD, which was fitted in F. 62; engine is of "broad arrow" type with 12 cylinders in three banks of four each; cylinder bore 130 mm.; stroke, 160 mm.

Fuel-Air Ratio, Relation to Performance. Relation of Fuel-Air Ratio to Engine Performance, S. W. Sparrow. Nat. Advisory Committee for Aeronautics, report no. 189, 1924, 16 pp. 18 figs. Concludes that (1) with gasoline as fuel, maximum power is obtained with fuel-air mixtures of from 0.07 to 0.08 lb. of fuel per lb. of air; (2) maximum power is obtained with approximately same ratio over range of air pressures and temperatures encountered in flight; (3) nearly minimum specific fuel consumption is secured by decreasing fuel content of charge until power is 95 per cent of its maximum value.

High-Speed. Comparison of Three Types of Airplane Engines (Comparaison de trois types de moteurs d'aviation), M. Martinot-Lagarde. Technique Moderne, vol. 16, no. 15, Aug. 1, 1924, pp. 519–522, 4 figs. Details of design and construction of Renault, Lorraine-Dietrich and Farman engines of 400 to 600 hp., their equipment and efficiency; gives tables of principal characteristics.

Valves and Guides. Exhaust-Valves and Guides for Aircraft Engines, S. D. Heron. Soc. Automotive Engrs.—Jl., vol. 15, no. 2, Aug. 1924, pp. 122–132, 9 figs. Discusses valve cooling and valve and guide wear in connection with type-J air-cooled cylinder developing 48 b.hp. at 1650 r.p.m., including internal valve cooling and methods of application, valve steels, valve guides, valve sizes, etc.

AIRPLANE PROPELLERS

Models, Turbine Drive for. Turbine Drive for Propeller Models, L. H. Crook. Franklin Inst.—Jl., vol. 199, no. 1, July 1924, pp. 85–91, 6 figs. Details of construction of air turbine for U. S. Navy aerodynamic laboratory to drive propeller in 8- by 8-ft. wind tunnel with air pressure of 90 lb. per sq. in. and its successful application.

AIRPLANES

Albatros. New Albatros Airplanes (Neue Albatros-Flugzeuge), G. Krupp. Zeit. für Flugtechnik u. Motorluftschiffahrt, vol. 15, no. 13–14, July 26, 1924, pp. 126–127, 3 figs. Details of L58 for seven passengers; 260-hp. Maybach engine; speed, 150 km. per hr.; L59 for sport, 55-hp. SH engine; L66 for two, with 30-hp. engine.

Biplanes. Pressure Distribution Over the Wings of, and Force Measurements on, a Model B. E. 2 C Biplane with Raked Wing Tips, A. S. Batson and H. L. Nixon. Aeronautical Research Committee, no. 891, May 1923, 31 pp., 21 figs. partly on supp. plate. Results of experiments show that in upper wing center sections reach critical angle before outer sections, causing relatively heavy loading near wing tips, etc.

Blackburn-Napier "Cubaroo." The Blackburn-Napier "Cubaroo." Flight, vol. 16, no. 35, Aug. 28, 1924, pp. 537–539, 7 figs. Describes long-distance torpedo-plane with 1000 hp. Napier "Cub" engine; span of biplane wings, 88 ft.; overall length, 54 ft.; height, 20 ft.

Daimler. The German Light Airplane Daimler L15 (Das deutsche Daimler-Leichtflugzeug L15), W. v. Langsdorff. Zeit. für Flugtechnik u. Motorluftschiffahrt, vol. 15, no. 11–12, June 26, 1924, pp. 121–122, 4 figs. Discusses development of light airplanes with low motive power based on successes of glider planes, and describes L15 glider with 7–9 hp. motor.

Flying Boats. See FLYING BOATS.

Gliders. Dimensions of Gliders at the Rhön Competition 1924 (Ueber die Vermessung der Segelflüge im Rhönwettbewerb 1924). Luftfahrt, vol. 28, no. 3, Mar. 15, 1924, pp. 33–47, 16 figs. Series of articles on gliders and gliding questions, dynamic gliding, gliding at sea and over plains, construction of gliders, etc.

The New Gliding Plane of the Hanover Technical High School (Das neue Segelflugzeug der Technischen Hochschule Hannover), W. Günter. Zeit. für Flugtechnik u. Motorluftschiffahrt, vol. 15, no. 11–12, June 26, 1924, pp. 122–124, 7 figs. Details of design; gliding angle, 1: 28.8; soaring speed 0.448 m. per sec.; weight, 75 kg.; width, 15 m.; bearing surface, 15 sq. m.

Helicopters. See HELICOPTERS.

Performance Estimation. Charts for Graphical Estimation of Airplane Performance, W. S. Diehl. Nat. Advisory Committee for Aeronautics, report no. 192, 1924, 12 pp. 19 figs. Gives charts for estimating propeller diameter and efficiency, maximum speed, initial rate of climb, absolute ceiling, climb in 10 min., time to climb to any altitude, maximum speed at any altitude, and endurance.

AIRSHIPS

Man-Driven. A Man-Driven Dirigible, U. Novile. Aviation, vol. 12, no. 9, Sept. 1, 1924, pp. 934–936. Conclusions reached by author in regard to new machine he has in mind, which he calls "cycle-airship," in which, by means of transmission devices analogous to those of bicycles, muscular force of passengers themselves would be utilized for propulsion.

Motors for. See GAS TURBINES, Automobiles.

Semi-Rigid. The Italian Semi-Rigid Airship "MR." Flight, vol. 16, no. 36, Sept. 4, 1924, pp. 550–551, 2 figs. Also Aviation, vol. 17, no. 8, Aug. 25, 1924, p. 913, 1 fig. Particulars of smallest airship in world: overall length 105 ft.; diameter 25 ft. 6 in.; capacity 33,900 cu. ft.; useful load 992 lb.; speed 40 m.p.h. May be usefully employed for short-radius scouting, experimental work, etc.

ALLOYS

Aluminum. See ALUMINUM ALLOYS.

Bearing Metals. See BEARING METALS.

Bronzes. See BRONZES.

Gun Metal. See GUN METAL.

Preparation. The Preparation of Pure Alloys, R. F. Mehl. Am. Electrochem. Soc., Advance Paper No. 2, for meeting Oct. 2–4, 1924, pp. 9–36, 6 figs. Discusses metallographic data, with particular reference to effect of impurities upon electrical measurements; contamination; preparation of pure basic oxide crucibles; new method of making pure magnesia crucibles of high strength and density, for use up to 1200 deg. cent.; describes combined furnace and casting apparatus for preparation of very pure alloys in a form suitable for measurement of electrical properties; methods for measurement of thermoelectromotive force and temperature coefficient of resistance of aluminum-magnesium alloys; results of preliminary measurements of temperature coefficient of resistance and of thermoelectromotive force and its temperature coefficient, upon certain compositions of system Al–Mg.

ALUMINUM

Annealing. Soft Annealing of Aluminum (Das Weichglühen von Aluminium), H. Röhrig. Zeit. für Metallkunde, vol. 16, no. 7, July 1924, pp. 265–270, 10 figs. Discusses aluminum sheets, determination of relation between degree and velocity of becoming soft, and duration, temperature and strength of heat

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NOTE.—The abbreviations used in indexing are as follows:

Academy (Acad.)
American (Am.)
Associated (Assoc.)
Association (Assn.)
Bulletin (Bul.)
Bureau (Bur.)
Canadian (Can.)
Chemical or Chemistry (Chem.)
Electrical or Electric (Elec.)
Electrician (Elecn.)
Engineer[s] (Engr.[s])
Engineering (Eng.)
Gazette (Gaz.)
General (Gen.)
Geological (Geol.)
Heating (Heat.)
Industrial (Indus.)
Institute (Inst.)
Institution (Instn.)
International (Int.)
Journal (Jl.)
London (Lond.)
Machinery (Machy.)
Machinist (Mach.)
Magazine (Mag.)
Marine (Mar.)
Materials (Matls.)
Mechanical (Mech.)
Metallurgical (Met.)
Mining (Min.)
Municipal (Mun.)
National (Nat.)
New England (N. E.)
Proceedings (Proc.)
Record (Rec.)
Refrigerating (Refrig.)
Review (Rev.)
Railway (Ry.)
Scientific or Science (Sci.)
Society (Soc.)
State names (Ill., Minn., etc.)
Supplement (Supp.)
Transactions (Trans.)
United States (U. S.)
Ventilating (Vent.)
Western (West.)

Classified List of Mechanical Equipment
Manufactured by Firms Represented in MECHANICAL ENGINEERING

FOR ALPHABETICAL LIST OF ADVERTISERS, SEE PAGE 154

Accumulators, Hydraulic
* Farrel Foundry & Machine Co.
Mackintosh-Hemphill Co.
* Worthington Pump & Mchry. Corp'n.

Aftercoolers, Air
* Ingersoll-Rand Co.

Agitators
Hill Clutch Machine & Fdry. Co.

Air Compressors, Receivers, etc.
(See Compressors, Receivers, etc., Air)

Air Conditioning Apparatus
* American Blower Co.
* Carrier Engineering Corp'n
* Clarage Fan Co.
Sturtevant, B. F. Co.

Air-Jet Lifts
* Schutte & Koerting Co.

Air Washers
* American Blower Co.
* Carrier Engineering Corp'n
* Clarage Fan Co.
* Cooling Tower Co. (Inc.)
Sturtevant, B. F. Co.

Alloys
Driver-Harris Co.

Ammeters
* Bristol Co.
* General Electric Co.
* Westinghouse Electric & Mfg. Co.

Anemometers
Weber, F. Co. (Inc.)

Annealing
* American Metal Treatment Co.
* Nuttall, R. D. Co.

Arc Welding Equipment
* Westinghouse Electric & Mfg. Co.

Arches, Boiler Furnace
* McLeod & Henry Co.
* Titusville Iron Works Co.

Arches, Fire Door
* McLeod & Henry Co.

Arches, Ignition (Flat Suspended)
* Combustion Engineering Corp'n
* McLeod & Henry Co.

Asbestos Products
Carey, Philip Co.
* Garlock Packing Co.
Johns-Manville (Inc.)

Ash Lifts, Telescopic
* Palmer-Bee Co.

Autoclaves
* Farrel Foundry & Machine Co.

Babbitt Metal
* Medart Co.
* Westinghouse Electric & Mfg. Co.

Ball Bearings, Gages, etc.
(See Bearings, Gages, Ball)

Balls, Brass and Bronze
* Atlas Ball Co.
* Gwilliam Co.

Balls, Steel
* Atlas Ball Co.
* Gwilliam Co.
* New Departure Mfg. Co.
* S K F Industries (Inc.)

Barometers
* American Schaeffer & Budenberg Corp'n

Barometers, Mercurial
* Tagliabue, C. J. Mfg. Co.

Bearings, Ball
* Fafnir Bearing Co.
* Gwilliam Co.
* Marlin-Rockwell Corp'n
* New Departure Mfg. Co.
* Norma - Hoffmann Bearings Corp'n
* S K F Industries (Inc.)
* Strom Ball Bearing Mfg. Co.

Bearings, Collar Oiling
Hill Clutch Machine & Foundry Co.

Bearings, Radial Thrust
* New Departure Mfg. Co.

Bearings, Roller
* Gwilliam Co.
* Hyatt Roller Bearing Co.
* Norma - Hoffmann Bearings Corp'n
* Royersford Fdry. & Mach. Co.
* Timken Roller Bearing Co.

Bearings, Self-Oiling
* Brown, A. & F. Co.
* Doehler Die-Casting Co.
* Falls Clutch & Machinery Co.
Hill Clutch Machine & Fdry. Co.
* Jones, W. A. Fdry. & Mach. Co.
Link-Belt Co.
* Royersford Fdry. & Mach. Co.
Wood's, T. B. Sons Co.

Bearings, Tapered
* Timken Roller Bearing Co.

Bearings, Thrust
* Fafnir Bearing Co.
* General Electric Co.
* Gwilliam Co.
Hill Clutch Machine & Fdry. Co.
* Norma - Hoffmann Bearings Corp'n
* S K F Industries (Inc.)
* Strom Ball Bearing Mfg. Co.
* Timken Roller Bearing Co.

Belt Dressing
* Dixon, Joseph Crucible Co.
Gandy Belting Co.

Belt Lacing, Steel
* Bristol Co.

Belt Tighteners
* Brown, A. & F. Co.
Hill Clutch Machine & Fdry. Co.
* Jones, W. A. Fdry. & Mach. Co.
Link-Belt Co.
* Medart Co.
* Smidth, F. L. & Co.
Wood's, T. B. Sons Co.

Belt Tighteners, Automatic
Hill Clutch Machine & Fdry. Co.

Belting, Canvas (Stitched)
Gandy Belting Co.
* United States Rubber Co.

Belting, Conveyor
Gandy Belting Co.
* Goodrich, B. F. Rubber Co.
* United States Rubber Co.

Belting, Elevator
Gandy Belting Co.
* Goodrich, B. F. Rubber Co.
* United States Rubber Co.

Belting, Endless
Gandy Belting Co.

Belting, Fabric
Gandy Belting Co.

Belting, Rubber
* Goodrich, B. F. Rubber Co.
* United States Rubber Co.

Belting, Waterproof
Gandy Belting Co.

Bending & Straightening Machines
* Long & Allstatter Co.

Bends, Pipe
* Frick Co. (Inc.)
* Vogt, Henry Machine Co.

Billets, Steel
* Timken Roller Bearing Co.

Blocks, Tackle
Clyde Iron Work Sales Co.
* Roebling's, John A. Sons Co.

Blowers, Centrifugal
* American Blower Co.
* Clarage Fan Co.
* Coppus Engineering Corp'n
* De Laval Steam Turbine Co.
* General Electric Co.
* Ingersoll-Rand Co.
Kerr Turbine Co.
Sturtevant, B. F. Co.
* Westinghouse Electric & Mfg. Co.

Blowers, Fan
* American Blower Co.
* Clarage Fan Co.
* Coppus Engineering Corp'n
* Green Fuel Economizer Co.
Sturtevant, B. F. Co.

Blowers, Forge
* American Blower Co.
Sturtevant, B. F. Co.

Blowers, Pressure
* American Blower Co.
* Clarage Fan Co.
Lammert & Mann Co.
Sturtevant, B. F. Co.

Blowers, Rotary
Lammert & Mann Co.
* Schutte & Koerting Co.
Sturtevant, B. F. Co.

Blowers, Soot
Diamond Power Specialty Corp'n
Sturtevant, B. F. Co.

Blowers, Steam Jet
* Schutte & Koerting Co.

Blowers, Turbine
* Coppus Engineering Corp'n
Sturtevant, B. F. Co.

Blueing (Metal)
* American Metal Treatment Co.

Boards, Drawing
Dietzgen, Eugene Co.
Keuffel & Esser Co.
New York Blue Print Paper Co.
U. S. Blue Co.
Weber, F. Co. (Inc.)

Boiler Baffles
* King Refractories Co. (Inc.)
* McLeod & Henry Co.

Boiler Compounds
* Dixon, Joseph Crucible Co.
Unisol Mfg. Co.

Boiler Coverings, Furnaces, Tube Cleaners, etc.
(See Coverings, Furnaces, Tube Cleaners, etc., Boiler)

Boiler Fronts
* O'Brien, John Boiler Works Co.
* Titusville Iron Works Co.

Boiler Settings, Steel Cased
* Casey-Hedges Co.
* McLeod & Henry Co.
* O'Brien, John Boiler Works Co.
* Vogt, Henry Machine Co.
* Walsh & Weidner Boiler Co.

Boilers, Heating
* Casey-Hedges Co.
* Erie City Iron Works
* Keeler, E. Co.
* Leffel, James & Co.
Lidgerwood Mfg. Co.
* O'Brien, John Boiler Works Co.
* Titusville Iron Works Co.
* Union Iron Works
* Walsh & Weidner Boiler Co.

Boilers, Locomotive
* Casey-Hedges Co.
* Keeler, E. Co.
* Leffel, James & Co.
* Titusville Iron Works Co.
* Union Iron Works
* Walsh & Weidner Boiler Co.

Boilers, Marine (Scotch)
Bethlehem Shipbldg.Corp'n(Ltd.)
* Casey-Hedges Co.
* Leffel, James & Co.
* Titusville Iron Works Co.
* Walsh & Weidner Boiler Co.

Boilers, Marine (Water Tube)
* Babcock & Wilcox Co.
Bethlehem Shipbldg.Corp'n(Ltd.)
* Casey-Hedges Co.
* Connelly, D. Boiler Co.
* O'Brien, John Boiler Works Co.
* Springfield Boiler Co.
* Titusville Iron Works Co.
* Walsh & Weidner Boiler Co.

Boilers, Portable
* Casey-Hedges Co.
* Erie City Iron Works
* Frick Co. (Inc.)
* Keeler, E. Co.
* Leffel, James & Co.
Lidgerwood Mfg. Co.
* O'Brien, John Boiler Works Co.
* Titusville Iron Works Co.
* Union Iron Works
* Walsh & Weidner Boiler Co.

Boilers, Tubular (Horizontal Return)
* Bigelow Co.
* Casey-Hedges Co.
* Cole, R. D. Mfg. Co.
* Connelly, D. Boiler Co.
* Erie City Iron Works
* Keeler, E. Co.
* Leffel, James & Co.
Lidgerwood Mfg. Co.
Morrison Boiler Co.
* O'Brien, John Boiler Works Co.
* Titusville Iron Works Co.
* Union Iron Works
* Vogt, Henry Machine Co.
* Walsh & Weidner Boiler Co.
* Webster, Howard J.
* Wickes Boiler Co.

Boilers, Tubular (Vertical Fire)
* Bigelow Co.
* Casey-Hedges Co.
Clyde Iron Works Sales Co.
* Keeler, E. Co.
* Leffel, James & Co.
Lidgerwood Mfg. Co.
Morrison Boiler Co.
* O'Brien, John Boiler Works Co.
* Titusville Iron Works Co.
* Union Iron Works
* Walsh & Weidner Boiler Co.

Boilers, Water Tube (Horizontal)
* Babcock & Wilcox Co.
Bethlehem Shipbldg.Corp'n(Ltd.)
* Casey-Hedges Co.
* Cole, R. D. Mfg. Co.
* Connelly, D. Boiler Co.
* Edge Moor Iron Co.
* Erie City Iron Works
* Keeler, E. Co.
* Ladd, George T. Co.
Morrison Boiler Co.
* O'Brien, John Boiler Works Co.
* Springfield Boiler Co.
* Union Iron Works
* Vogt, Henry Machine Co.
* Walsh & Weidner Boiler Co.
* Wickes Boiler Co.

Boilers, Water Tube (Inclined)
* Babcock & Wilcox Co.
Bethlehem Shipbldg.Corp'n(Ltd.)
* Bigelow Co.
* Casey-Hedges Co.
* Keeler, E. Co.
* Ladd, George T. Co.
Morrison Boiler Co.
* O'Brien, John Boiler Works Co.
* Vogt, Henry Machine Co.
* Walsh & Weidner Boiler Co.

Boilers, Water Tube (Vertical)
* Babcock & Wilcox Co.
* Bigelow Co.
* Casey-Hedges Co.
* Erie City Iron Works
* Keeler, E. Co.
* Ladd, George T. Co.
Morrison Boiler Co.
* O'Brien, John Boiler Works Co.
* Walsh & Weidner Boiler Co.
* Wickes Boiler Co.

Boring and Drilling Machines
Universal Boring Machine Co.

Boring, Drilling and Milling Machines (Horizontally Combined)
Universal Boring Machine Co.

Boxes, Carbonizing
Driver-Harris Co.

Boxes, Case Hardening
Driver-Harris Co.

Brake Blocks
Johns-Manville (Inc.)

Brakes, Air
* Allis-Chalmers Mfg. Co.
* General Electric Co.

Brass Goods
* Scovill Mfg. Co.

Brass Mill Machinery
* Farrel Foundry & Machine Co.

Breechings, Smoke
Morrison Boiler Co.
* Titusville Iron Works Co.
* Vogt, Henry Machine Co.

Brick, Fire
* Bernitz Furnace Appliance Co.
* Celite Products Co.
* Drake Non-Clinkering Furnace Block Co.
* King Refractories Co. (Inc.)
* McLeod & Henry Co.
Maphite Co. of Amer.

*Catalogue data of firms marked * appear in the A.S.M.E. Condensed Catalogues of Mechanical Equipment, 1924-25 Volume*

transmission; also tensile strength, elasticity, and size of grain.

Castings. Casting Aluminum Cycle Parts, H. R. Simonds. Foundry, vol. 52, no. 17, Sept. 1, 1924, pp. 661–664, 8 figs. Congested condition of streets in business sections of cities has opened new fields for motorcycle. Many parts being made of aluminum to secure lightness. Notes on methods employed by Springfield Malleable Iron Co., Springfield, Mass., in modern aluminum and brass foundry recently started to care for increased demands for aluminum alloy castings and other non-ferrous foundry business.

Properties, Effect of Cadmium on. The Influence of Cadmium upon the Mechanical Properties of Aluminum, N. F. Budgen. Metal Industry (Lond.), vol. 25, nos. 7 and 8, Aug. 15 and 22, 1924, pp. 145–147 and 172–174, 8 figs. From results of investigations it appears that cadmium has no beneficial influence on aluminum and is not comparable with zinc in this respect. Moreover, addition of cadmium to "burnt" aluminum has no recuperative effect.

Silicon and Iron in. Effect of Silicon and Iron on the Properties of Aluminum (Der Einfluss von Silizium und Eisen auf die Eigenschaften des Aluminiums), J. Czochralski. Zeit. für Metallkunde, vol. 16, no. 5, May 1924, pp. 162–173, 36 figs. Research work by committee of German Soc. of Metallography; discusses metallographic and mechanical examination of aluminum samples of different contents of iron silicide and silicon eutectic; irregular distribution, capacity for rolling, etc.

Soldering. Processes for Combining Aluminum with Aluminum and Other Metals (Verfahren zur Verbindung von Aluminium mit Aluminium und anderen Metallen. Zeit. für die Gesamte Giessereipraxis, vol. 45, no. 21, May 24, 1924, pp. 57–58 (Metall). Discusses soft-soldering, autogeneous welding, and hard-soldering processes, their advantages and drawbacks.

Substitute for. Magnesium Alloy a Substitute for Aluminum. Can. Foundryman, vol. 15, no. 6, June 1924, pp. 22–23. Castings are stronger and lighter; easily machined and polished; proof against alkalis but not acids, reverse of aluminum; manganese deoxidizer of copper.

ALUMINUM ALLOYS

Aluminum-Zinc. Behavior of Aluminum-Zinc Alloys (Das Verhalten der Aluminium-Zinklegierungen), O. Bauer and W. Heidenhain. Zeit. für Metallkunde, vol. 16, no. 6, June 1924, pp. 221–228, 9 figs. Critical review of latest work on solidification and transformation of total shrinkage, resistance to shock and behavior in attack by acids, etc.; limits of range of instability of aluminum-zinc alloys, etc.

Studies in the Aluminium-Zinc System, T. Tanabe. Inst. of Metals, Advance paper no. 13, for Mtg. Sept. 8–11, 1924, 38 pp., 32 figs. partly on supp. plate. Describes investigation made to confirm new diagram of Hanson and Gayler, and to make clear nature of age-hardening. Mechanical properties also studied.

The Mechanical Properties of Aluminium-Zinc Alloys Containing Cadmium, N. F. Budgen. Chemistry & Industry, vol. 43, no. 33, Aug. 15, 1924, pp. 273T–276T. Range of alloys examined includes mixtures containing from 0 to 24 per cent Zn, 0 to 10 per cent Cd and 66 to 100 per cent Al; from certain alloys containing 10 per cent Cd, small beads of more fusible constituent exude from surface after chill casting; under hammer all specimens cracked badly above 250 deg., but those containing less than total of 18 per cent Zn + Cd forged well below this temperature.

Castings. Aluminum Alloy Castings from Sheet Scrap, H. C. Knerr. Am. Foundrymen's Assn., Preprint No. 417, for Mtg. Oct. 11–16, 1924, 12 pp., 7 figs. Outlines methods by which a very small foundry, started on an experimental basis, succeeded in meeting requirements for sound and dependable aluminum alloy sand castings, only scrap aluminum sheet and copper available at factory being used. Castings made were required to meet government specifications corresponding approximately to S.A.E. specifications No. 30.

Duralumin. See DURALUMIN.

Properties. Comparative Tensile Properties of Copper-Silicon-Aluminium and Other Aluminium Alloys as Obtained on Separately Cast Specimens and Specimens Cut from a Crank-Case Casting, E. H. Dix and A. J. Lyon. Inst. of Metals, Advance paper no. 4, for Mtg. Sept. 8–11, 1924, 14 pp., 21 figs. on supp. plates. Particulars of investigation undertaken by Metallurgical Sec., Eng. Division U. S. Air Service, to furnish information on comparative physical properties to be expected in large castings to aircraft designers.

Aluminum and Some of Its Physical Characteristics. Metal Industry (N. Y.), vol. 22, no. 9, Sept. 1924, pp. 349–351. Discusses properties of alloys made by Aluminum Co. of America; aluminum die castings, and wrought aluminum.

APPRENTICES, TRAINING OF

Foundry. Apprentice Course Is Established, E. C. Kreutzberg. Iron Trade Rev., vol. 75, no. 7, Aug. 14, 1924, pp. 413–414, 2 figs. Foundrymen's Assn. of New Jersey inaugurates plan of instruction in practical foundry work to recruit ranks of iron molders in that district. Outline of course.

Repair-Shop Mechanics. Training Men for Automobile Repair Work, J. Younger. Am. Mach., vol. 61, no. 11, Sept. 11, 1924, pp. 423–425, 3 figs. Outline of plan used for training men for Buick service stations and showing how flat rates are set for automobile repairs.

AUTOMOBILE ENGINES

Air Cleaners for. California Air-Cleaner Tests, 1924, Series, A. H. Hoffman. Soc. Automotive Engrs.—Jl., vol. 15, no. 2, Aug. 1924, pp. 140–148, 8 figs. Details of work of Univ. of Cal., Agricultural Experiment Station in continuation of 1922 tests, method of testing cleaners that cannot be tested by 1922 method, determining how much dust an auto or truck encounters in service, how air cleaners affect rate of engine wear, and gives tabular summary of results.

Carburetors. See CARBURETORS.

Crankcase-Oil Dilution. The Danger Point of Dilution. Soc. Automotive Engrs.—Jl., vol. 15, no. 2, Aug. 1924, pp. 117–121. Twenty-six makers report views on dilution factors and propose remedies.

Supercharging. Superchargers. Autocar, vol. 53, no. 1505, Aug. 22, 1924, p. 322, 2 figs. Explains type of blower used for most modern racing engines.

Two-Stroke, Rattle. Two-Stroke Engine Rattle, G. Funk. Automobile Engr., vol. 14, no. 192, Aug. 1924, pp. 235–236, 5 figs. Examination of its cause and remedy.

Willys-Knight. Willys-Knight Adds Lanchester Balancer and Increases Engine Torque, D. Blanchard. Automotive Industries, vol. 51, no. 10, Sept. 4, 1924, pp. 435–436, 2 figs. Unbalanced rotating weights located in bottom of crankcase compensate for secondary unbalanced forces on reciprocating masses. Valve timing changed and compression increased.

AUTOMOBILE FUELS

France. Economic Considerations as to the Future of Artificial Liquid Fuels in France (Considérations économiques sur l'avenir des combustibles liquides artificiels en France), M. DeConinck. Chaleur et Industrie, vol. 5, no. 50, June 1924, pp. 269–276. Discusses gasoline problem, especially in connection with coke; manufacture of liquid hydrocarbons by fixation of hydrogen on organic fossil materials; hydrogenation of solid fuel, etc.

(See also INTERNAL-COMBUSTION ENGINES, Fuels.)

AUTOMOBILES

Brakes. Four-Wheel Brakes and Low Pressure Tires Prove Worth in Grand Prix, W. F. Bradley. Automotive Industries, vol. 51, no. 8, Aug. 21, 1924, pp. 364–365, 1 fig. Discusses 14-mile course requiring twenty gear changes per lap; superchargers give considerably more power.

Recent Patents Reveal Tendencies in Brake Design. Automotive Industries, vol. 51, no. 12, Sept. 18, 1924, pp. 520–522, 8 figs. Outlines some recently issued foreign brake patents. Among features covered are equalization without loss of all brakes should linkage break, simultaneous operation of transmission and rear-wheel brakes and servo mechanism.

Buick. The New 20 H.P. Buick. Auto-Motor Jl., vol. 29, no. 34, Aug. 21, 1924, p. 708, 2 figs. Design and construction of two models of six-cylindered engines.

Burford-Kegresse. The Burford-Kegresse Chassis. Motor Transport (Lond.), vol. 39, no. 1018, Sept. 1, 1924, pp. 257–259, 7 figs. Constructional details and particulars of performance in strenuous drawbar tests; engine with all four cylinders in single casting has bore and stroke of 100 and 140 mm., respectively.

Calcott. A Completely New Calcott. Autocar, vol. 53, no. 1507, Sept. 5, 1924, pp. 421–424, 10 figs. Specifications: 12.8 hp., four-cylinder, 72- by 120-mm. detachable-head engine; single dry-plate clutch, separate four-speed gear-box transmission; detachable steel wheels with low-pressure tires.

Chrysler. The Chrysler Six. Auto-Motor Jl., vol. 29, no. 33, Aug. 14, 1924, pp. 685–687, 9 figs. Describes automobile having six-cylindered 68-hp. engine designed monobloc construction with bore of 3 in. and stroke of 4¼ in.

Crouch. The 12–30 H.P. Crouch. Auto-Motor Jl., vol. 29, no. 36, Sept. 4, 1924, pp. 745–747, 10 figs. Features of design of small car; engine is 20–30 hp. British Anzani, having four cylinders of 69 mm. bore and piston stroke of 100 mm.; cylinders are cast en bloc and have detachable head.

Electric. Electric Storage-Battery Automobiles (Les automobiles électriques à accumulateurs), A. Billaz. Vie Technique et Industrielle, vol. 5, no. 58, July 1924, pp. 232–239, 11 figs. Discusses lead and iron-nickel batteries, construction and prices, battery motors, batter trucks and their construction, operation and control.

Test of Electric Storage-Battery Vehicles (Essais de véhicules à traction électrique par accumulateurs), M. Rossignol. Arts et Métiers, vol. 77, no. 48, July 1924, pp. 260–265. Gives details of French competition and tables of data on principal French makes.

Inspection. Inspection Methods Symposium, C. S. Stark, A. H. Frauenthal and C. J. Jones. Soc. Automotive Engrs.—Jl., vol. 15, no. 2, Aug. 1924, pp. 156–162, 4 figs. Series of papers on inspection of processed materials, influence of numerous handlings on inspection cost, and maintenance of high-quality production.

Jordan Eight. Jordan Eight, Added to Lines of Sixes, Now in Production, D. Blanchard. Automotive Industries, vol. 51, no. 8, Aug. 21, 1924, pp. 352–354, 3 figs. L-head design is used in new engine, which has piston displacement of 268.6 cu. in. and N.A.C.C. rating of 28.8 hp.; actual hp. 74 at 3000 r.p.m.; crankshaft is carried in five bearings.

Locomobile. Locomobile Makes Many Detailed Changes to Lengthen Life of Car, P. M. Heldt. Automotive Industries, vol. 51, no. 9, Aug. 28, 1924, pp. 393–396, 8 figs. Six-cylinder engine now develops as high as 107 hp. on brake at 2150 r.p.m. and four-passenger stock car said to be capable of speed of 76 m.p.h.; frame stiffened and potential sources of noise eliminated; aluminum pistons, full pressure lubrication, and self-adjusting spring shackles adopted.

Lubrication. Saving Lubricant. Motor Transport (Lond.), vol. 39, no. 1017, Aug. 25, 1924, pp. 245–247, 8 figs. Details of system that eliminates need for lubricating many parts of chassis.

Maybach. The 22/70 Hp. Gearless Passenger Automobile by Maybach Motorenbau Co. (Der 22/70 PS-Personenkraftwagen ohne Schaltung der Firma Maybach-Motorenbau G.m.b.H., Friedrichshafen a.B.). Zeit. des Vereines Deutscher Ingenieure, vol. 68, no. 33, Aug. 16, 1924, pp. 841–848, 22 figs. New design for high average speed, with four-wheel brakes; speed-change gear is replaced by coupling with planetary gears, four-stroke six-cylinder gasoline engine used; details of chassis and engine.

Minerva. The 30 H.P. Minerva. Auto-Motor Jl., vol. 29, no. 34, Aug. 21, 1924, pp. 705–707, 9 figs. Design and construction of six-cylindered 30-hp. Minerva automobile with silent sleeve-valve engine and four-wheel braking.

Moon. The Latest 20 H.P. Moon. Auto-Motor Jl., vol. 29, no. 33, Aug. 14, 1924, p. 688, 2 figs. Describes latest model of Moon car, including four-wheel brakes operated on Lockheed hydraulic system, six-cylindered Continental motor, bore 3⅛ in. and stroke 4¼ in., of 54 hp. at 2500 r.p.m.; power transmitted through Borg & Beck 10-in. dry-plate clutch and three-speed Warner gear box.

Painting. Automatic Equipment Cuts Painting Cost. Iron Age, vol. 114, no. 10, Sept. 4, 1924, pp. 555–557, 4 figs. How frames for Ford cars are cleaned, painted, dried, and delivered to freight-car door at rate of 10 a minute by means of a new painting and conveying unit recently placed in operation.

Panhard. A New 10 h.p. Panhard. Autocar, vol. 53, no. 1508, Sept. 12, 1924, pp. 460–461, 3 figs. Specifications: 10-hp. engine of four cylinders, 65 by 105 mm.; four-speed gear box in unit with engine; brakes on all four wheels.

Racing. Straight Eight, Supercharged Car Wins Grand Prix, 503 Mile Race, W. F. Bradley. Automotive Industries, vol. 51, no. 6, Aug. 7, 1924, pp. 276–279, 4 figs. Details of Sunbeam, Fiat, Alfa, Bugatti, Delage, Schmid, and Miller cars and their behavior.

Riding Quality. Air-Springs and the Measurement of Automobile Riding-Quality, J. J. McElroy. Soc. Automotive Engrs.—Jl., vol. 15, no. 3, Sept. 1924, pp. 211–226 and (discussion) 227–228, 29 figs. Discusses load curves, and friction characteristics; describes field tests made of front-axle movements, and apparatus for these and other tests; factors that are important in measuring riding comfort; air-spring design and construction; manufacture of air springs; installation and service.

Steering Gears. New Lavine Steering Gear Moves Wheels Faster Near End of Range of Motion, B. M. Ikert. Automotive Industries, vol. 51, no. 10, Sept. 4, 1924, pp. 440–441, 2 figs. Features of new series Lavine steering gears recently brought out by Lavine Gear Co., Milwaukee. Provision made for taking up both circumferential and axial lost motion. Variable reduction ratio takes care of new conditions arising from adoption of low-pressure tires.

Studebaker. New Studebaker Models Have Pressure Lubrication and More Power, D. Blanchard. Automotive Industries, vol. 51, no. 12, Sept. 18, 1924, pp. 512–518, 10 figs. Balloon tires, transmissions integral with engines and automatic spark timing are regular features, while four-wheel brakes with servo mechanism come as an extra. Bodies and radiators changed.

The Studebaker Light Six. Auto-Motor Jl., vol. 29, no. 35, Aug. 28, 1924, pp. 725–727, 11 figs. Describes latest models of Canadian-built car; wheelbase is 9 ft. 4 in.; engine and clutch are one unit, and gear box separately mounted with universally jointed shaft transmitting power to semi-floating live axle; engine has its six cylinders cast en bloc with detachable head; bore, 79 mm.; stroke, 114 mm.

AVIATION

Aerial Navigation. Accuracy in Aerial Navigation (Ueber die Genauigkeit der Luftnavigierung), J. Van der Hoop. Luftfahrt, vol. 28 no. 7, July 5, 1924, pp. 117–120, 8 figs. Discusses advantages of flying below and above clouds, navigation by compass, by astronomic data and by radio, and advocates radio navigation combined with flying above clouds. Translated from Het Vliegveld.

Air-Mail Service. The Air Mail and the Banker. Aviation, vol. 17, no. 7, Aug. 18, 1924, pp. 886–887, 1 fig. Details of airplane arrangments for transcontinental mail service, lighting system of powerful beacons.

Commercial. What Is the World Flight Going to Mean to Commercial Aviation? A. Klemin. Automotive Industries, vol. 51, no. 9, Aug. 28, 1924, pp. 397–400, 1 fig. Fire hazard has largely been eliminated, heavy loads have been carried, variegated climates with abrupt changes can be negotiated and speed and endurance are proved.

B

BALANCING MACHINES

Dynamic. A New Balancing Apparatus (Ein neuer Auswuchtapparat), F. Punga. Elektrotechnische Zeit., vol. 45, no. 27, July 3, 1924, pp. 713–714, 5 figs. Describes new apparatus for balancing rapidly rotating bodies in which weight wanting is determined without stopping.

BEARING METALS

Anti-Friction. Anti-Friction Bearing Metals, P. W. Priestley. Automobile Engr., vol. 14, no. 192,

Manufactured by Advertisers — CLASSIFIED LIST OF MECHANICAL EQUIPMENT — Alphabetical List on page 154

Brick, Insulating
* Celite Products Co.
* Quigley Furnace Specialties Co.

Bridges, Coal and Ore Handling
* Brown Hoisting Machinery Co.
Link-Belt Co.

Bridgewalls (Furnace)
* McLeod & Henry Co.

Buckets, Elevator
* Brown Hoisting Machinery Co.
* Chain Belt Co.
* Gifford-Wood Co.
* Hendrick Mfg. Co.
* Jones, W. A. Fdry. & Mach. Co.
Link-Belt Co.
* Palmer-Bee Co.

Buckets, Grab
* Brown Hoisting Machinery Co.
Clyde Iron Works Sales Co.
Lidgerwood Mfg. Co.
Link-Belt Co.

Buckets, Self-Dumping
* Brown Hoisting Machinery Co.
Clyde Iron Works Sales Co.
Link-Belt Co.

Burners, Oil
Bethlehem Shipbldg. Corp'n (Ltd.)
* Combustion Engineering Corp'n
* Schutte & Koerting Co.

Burners, Powdered Fuel
* Combustion Engineering Corp'n
* Grindle Fuel Equipment Co.
* Quigley Furnace Specialties Co.

Bushings, Bronze
Hill Clutch Mach. & Fdry. Co.
Wood's, T. B. Sons Co.

Cabinets and Tables, Blue Print Filing
Dietzgen, Eugene Co.
Economy Drawing Table & Mfg. Co.
Keuffel & Esser Co.
U. S. Blue Co.
Weber, F. Co. (Inc.)

Cableways, Excavating
Lidgerwood Mfg. Co.

Cableways, Hoisting and Conveying
Lidgerwood Mfg. Co.

Calorimeters
* American Schaeffer & Budenberg Corp'n
* Sarco Co. (Inc.)

Calorizing
Calorizing Co.

Cars, Charging
* Whiting Corp'n

Cars, Industrial Railway
Link-Belt Co.
* Whiting Corp'n

Cars, Trolley (Industrial Railway)
Link-Belt Co.

Casehardening
* American Metal Treatment Co.
* Nuttall, R. D. Co.

Casings, Steel (Boiler)
* Casey-Hedges Co.
* Vogt, Henry Machine Co.
* Walsh & Weidner Boiler Co

Castings, Acid Resistant
* U. S. Cast Iron Pipe & Fdry. Co.

Castings, Aluminum
Buffalo Bronze Die Casting Corp'n

Castings, Brass
* Croll-Reynolds Engineering Co.
* Edward Valve & Mfg. Co.

Castings, Bronze
Buffalo Bronze Die Casting Corp'n

Castings, Die-Molded
* Doehler Die-Casting Co.
Veeder Mfg. Co.

Castings, Heavy
* Farrel Foundry & Machine Co.
Hill Clutch Mach. & Fdry. Co.
* U. S. Cast Iron Pipe & Fdry. Co.

Castings, Iron
Bethlehem Shipbldg. Corp'n (Ltd.)
* Brown, A. & F. Co.
* Builders Iron Foundry
* Burhorn, Edwin Co.
* Casey-Hedges Co.
* Central Foundry Co.
* Chain Belt Co.
* Cole, R. D. Mfg. Co.
* Croll-Reynolds Engineering Co.
* Falls Clutch & Machinery Co.
* Farrel Foundry & Machine Co.
* Franklin Machine Co.
* Garlock Packing Co.
Harrisburg Fdry. & Mach. Wks.
Hill Clutch Machine & Fdry. Co.
* Jones, W. A. Fdry. & Mach. Co.
Lidgerwood Mfg. Co.
Link-Belt Co.
* Nordberg Mfg. Co.
* Pittsburgh Valve, Fdry. & Const. Co.
* Royersford Fdry. & Mach. Co.
* U. S. Cast Iron Pipe & Fdry. Co.
* Vogt, Henry Machine Co.

Castings, Monel Metal
Driver-Harris Co., (In Canada)
* Edward Valve & Mfg. Co.

Castings, Nichrome
Driver-Harris Co.

Castings, Nickel Chromium
Driver-Harris Co.

Castings, Semi-Steel
* Builders Iron Foundry
* Chain Belt Co.
* Croll-Reynolds Engrg. Co. (Inc.)
* Farrell Foundry & Machine Co.
Hill Clutch Machine & Fdry. Co.
Link-Belt Co.
* Nordberg Mfg. Co.
* Vogt, Henry Machine Co.

Castings, Steel
* Falk Corporation
Link-Belt Co.
Mackintosh-Hemphill Co.
* Reading Steel Casting Co. (Inc.)
(Reading Valve & Fittings Div.)

Castings, White Metal
* Doehler Die-Casting Co.

Cement, Asbestos
Carey, Philip Co.

Cement, Iron and Steel
* Smooth-On Mfg. Co.

Cement, Pipe Joint
* Smooth-On Mfg. Co.

Cement, Refractory
* Celite Products Co.
Johns-Manville (Inc.)
* King Refractories Co. (Inc.)
* Quigley Furnace Specialties Co.

Cement, Water-Resistant
* Smooth-On Mfg. Co.

Cement Machinery
* Allis-Chalmers Mfg. Co.
Hill Clutch Machine & Fdry. Co.
Link-Belt Co.
* Smidth, F. L. & Co.
* Worthington Pump & Machinery Corp'n

Centrifugals, Chemical
Tolhurst Machine Works

Centrifugals, Metal Drying
Tolhurst Machine Works

Centrifugals, Sugar
Tolhurst Machine Works
* Worthington Pump & Mchry. Corp'n

Chain Belts and Links
* Chain Belt Co.
* Diamond Chain & Mfg. Co.
* Gifford-Wood Co.
* Jones, W. A. Fdry. & Mach. Co.
Link-Belt Co.
Union Chain & Mfg. Co.
* Whitney Mfg. Co.

Chains, Block
* Palmer-Bee Co.

Chains, Power Transmission
Baldwin Chain & Mfg. Co.
* Chain Belt Co.
* Diamond Chain & Mfg. Co.
Link-Belt Co.
* Morse Chain Co.
Union Chain & Mfg. Co.
* Whitney Mfg. Co.

Charging Machines
* Whiting Corp'n

Chimneys, Brick (Radial)
Morrison Boiler Co.

Chucking Machines
* Jones & Lamson Machine Co.
* Warner & Swasey Co.

Chucks, Drill
* S K F Industries (Inc.)
* Whitney Mfg. Co.

Chucks, Tapping
* Whitney Mfg. Co.

Chutes
* Chain-Belt Co.
* Gifford-Wood Co.
* Hendrick Mfg. Co.
Link-Belt Co.

Circuit Breakers
* General Electric Co.
* Westinghouse Elec. & Mfg. Co.

Circulators, Feed Water
* Schutte & Koerting Co.

Circulators, Steam Heating
* Schutte & Koerting Co.

Cloth, Rubber
* Garlock Packing Co.
* Goodrich, B. F. Rubber Co.

Cloth, Tracing
Alteneder, Theo. & Sons
Dietzgen, Eugene Co.
Keuffel & Esser Co.
New York Blue Print Paper Co.
U. S. Blue Co.
Weber, F. Co. (Inc.)

Clutches, Friction
* Allis-Chalmers Mfg. Co.
* Brown, A. & F. Co.
* Falls Clutch & Machinery Co.
* Farrell Foundry & Machine Co.
* Gifford-Wood Co.
Hill Clutch Mach. & Fdry. Co.
Johnson, Carlyle Machine Co.
* Jones, W. A. Fdry. & Mach. Co.
Link-Belt Co.
* Medart Co.
Philadelphia Gear Works
* Western Engineering & Mfg. Co.
Wood's, T. B. Sons Co.

Coal
Pennsylvania Coal & Coke Co.

Coal and Ash Handling Machinery
* Brown Hoisting Machinery Co.
* Chain Belt Co.
* Combustion Engineering Corp'n
* Gifford-Wood Co.
Link-Belt Co.
* Palmer-Bee Co.
* Shepard Electric Crane & Hoist Co.

Coal Bins
* Brown Hoisting Machinery Co.
* Chain Belt Co.
Link-Belt Co.

Coal Breakers and Cleaners
Pennsylvania Crusher Co.

Coal Mine Equipment and Supplies
* General Electric Co.

Coal Minning Machinery
* General Electric Co.
* Ingersoll-Rand Co.

Coal Preparing Equipment
* Grindle Fuel Equipment Co.

Coaling Stations, Locomotive
* Chain Belt Co.
* Gifford-Wood Co.
Link-Belt Co.

Cocks, Air and Gage
* American Schaeffer & Budenberg Corp'n
* Ashton Valve Co.
* Crane Co.
* Jenkins Bros.
Lunkenheimer Co.
* Reading Steel Casting Co. (Inc.)
(Pratt & Cady Division)
* Vogt, Henry Machine Co.

Cocks, Blow-off
* Crane Co.
Lunkenheimer Co.
* Pittsburgh Valve, Fdry. & Const. Co.
* Reading Steel Casting Co. (Inc.)
(Pratt & Cady Division)

Cocks, Three-Way and Four-Way
* American Schaeffer & Budenberg Corp'n
* Crane Co.
* Crosby Steam Gage & Valve Co.
Lunkenheimer Co.
* Pittsburgh Valve, Fdry. & Const. Co.
* Reading Steel Casting Co. (Inc.)
(Pratt & Cady Division)

Coils, Pipe
* Superheater Co.
* Vilter Mfg. Co.
* Vogt, Henry Machine Co.

Coke
Pennsylvania Coal & Coke Co.

Cold Storage Plants
* De La Vergne Machine Co.

Collars, Shafting
* Chain Belt Co.
Hill Clutch Machine & Fdry. Co.
Link-Belt Co.
* Medart Co.
* Royersford Fdry. & Mach. Co.
Wood's, T. B. Sons Co.

Coloring (Metal)
* American Metal Treatment Co.

Combustion (CO_2) Recorders
* Sarco Co. (Inc.)
* Tagliabue, C. J. Mfg. Co.

Compressors, Air
* Allis-Chalmers Mfg. Co.
* General Electric Co.
* Goulds Mfg. Co.
* Ingersoll-Rand Co.
Mackintosh-Hemphill Co.
* Nordberg Mfg. Co.
* Titusville Iron Works Co.
* Wayne Tank & Pump Co.
* Worthington Pump & Machinery Corp'n

Compressors, Air, Centrifugal
* De Laval Steam Turbine Co.
* General Electric Co.

Compressors, Air, Compound
* Ingersoll-Rand Co.
* Nordberg Mfg. Co.
* Worthington Pump & Machinery Corp'n

Compressors, Ammonia
* Frick Co. (Inc.)
* Ingersoll-Rand Co.
* Vilter Mfg. Co.
* Vogt, Henry Machine Co.
* Worthington Pump & Machinery Corp'n

Compressors, Gas
* De Laval Steam Turbine Co.
* General Electric Co.
* Ingersoll-Rand Co.
* Nordberg Mfg. Co.
* Worthington Pump & Machinery Corp'n

Condensers, Ammonia
* De La Vergne Machine Co.
* Frick Co. (Inc.)
* Ingersoll-Rand Co.
* Vilter Mfg. Co.
* Vogt, Henry Machine Co.

Condensers, Barometric
* Allis-Chalmers Mfg. Co.
Buffalo Steam Pump Co.
* Ingersoll-Rand Co.
* U. S. Cast Iron Pipe & Fdry. Co.
* Wheeler, C. H. Mfg. Co.
* Wheeler Condenser & Engrg. Co.
* Worthington Pump & Machinery Corp'n

Condensers, Jet
* Allis-Chalmers Mfg. Co.
Buffalo Steam Pump Co.
Elliott Co.
* Ingersoll-Rand Co.
* Nordberg Mfg. Co.
* Schutte & Koerting Co.
* Wheeler, C. H. Mfg. Co.
* Wheeler Condenser & Engrg. Co.
* Worthington Pump & Machinery Corp'n

Condensers, Surface
* Allis-Chalmers Mfg. Co.
Bethlehem Shipbldg. Corp'n (Ltd.)
Elliott Co.
* Ingersoll-Rand Co.
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* Westinghouse Electric & Mfg. Co.
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* Wheeler Condenser & Engrg. Co.
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(See Regulators)

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* General Electric Co.
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* Builders Iron Foundry
* Simplex Valve & Meter Co.

Controllers, Liquid Level
* General Electric Co.
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Converters, Synchronous
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Conveying Systems, Powdered Coal
* Grindle Fuel Equipment Co.

*Catalogue data of firms marked * appear in the A.S.M.E. Condensed Catalogues of Mechanical Equipment, 1924-25 Volume*

Aug. 1924, pp. 225–230, 2 figs. Considers chemical, thermal, and physical characteristics of tin-base alloys.

BEARINGS, BALL

Crankshaft. How and Why Ball Bearings are Used on Car and Truck Crankshafts, P. M. Heldt. Automotive Industries, vol. 51, no. 6, Aug. 7, 1924, pp. 282–285, 9 figs. Discusses application and advantages of ball bearing and describes number of cars and trucks using them for crankshafts.

BEARINGS, ROLLER

Rolling-Mill. New Types of Bearings for Rolling Mills, D. C. Holzweiler. Iron Age, vol. 114, no. 8, Aug. 21, 1924, pp. 442–443, 5 figs. Results from application to German mill practice; staggering of special bearings; automatic lubrication. Abstracted from Stahl u. Eisen, Apr. 17, 1924.

BEARINGS, THRUST

Michell. The Pad System Applied to Large Journal Bearings, Johnstone-Taylor. Mar. Eng. & Shipg. Age, vol. 29, no. 8, Aug. 1924, pp. 476–478, 5 figs. Discusses practical application of principle; journal bearing and other applications.

BELT DRIVE

Short-Center. Short-center Belt Drives, G. A. Frenkel. Machy. (N. Y.), vol. 30, nos. 10, 11 and 12, June, July and Aug. 1924, pp. 747–753, 876–882 and 956–958, 23 figs. Deals with efficient transmission of power by belting, as determined by numerous experiments and extensive research. June: General characteristics, advantages, and methods of arrangement to meet different requirements. July: Determining coefficient of friction and procedure in designing drive for transmitting given amount of power. Aug.: Tension rollers and their bearings; arms, equalizing weights, fulcrum stands and shock absorbers. See also Machy. (Lond.), vol. 24, nos. 612, 615 and 620, June 19, July 10 and Aug. 21, 1924, pp. 353–358, 457–462 and 645–647, 23 figs.

BLAST-FURNACE GAS

Cleaning. Experiments with Electric Cleaning of Gas at Lübeck Blast Furnaces (Versuche an einer elektrischen Gasreinigung beim Hochofenwerk Lübeck), J. Dreher. Stahl u. Eisen, vol. 44, no. 30, July 24, 1924, pp. 873–879, 6 figs. Discusses experimental plant of Lurgi type and gives results of tests showing that cleaning of blast-furnace gas by means of electricity is possible technically even under unfavorable circumstances. Difficulty of dust question, general conclusions as to advantages of electric cleaning over previous systems.

BLAST FURNACES

Charging. Automatic Charging Devices for Blast Furnaces (Aufgebe-Vorrichtungen für Hochöfen), D. H. Dresler. Stahl u. Eisen, vol. 44, no. 33, Aug. 14, 1924, pp. 973–976, 8 figs. Discusses importance of uniform distribution of gases; favorable operating results with charcoal furnaces in Steiermark and Sweden; details of new devices for any desired distribution of charge; results obtained.

BLOWERS

Blast-Furnace, Reconstruction of. Reconstruction of Blast-Furnace Blowing Engines, W. Benedict. Power, vol. 60, no. 8, Aug. 19, 1924, pp. 290–291, 4 figs. By substitution of plate spring valves for heavy rotary valves and gearing, speed was increased from 75 to 95 r.p.m. and capacity correspondingly increased on six 3200-hp. twin blowing engines.

BOILER FEEDWATER

Treatment. Electrolytic Boiler Protection (Der Elektrolytkesselschutz), H. Manz. Wärme, vol. 47, nos. 28 and 29, July 11 and 18, 1924, pp. 325–327 and 338–340. Discusses results of experiments with Renger-Fuhrmann process on number of boiler plants showing that out of twenty cases only four were satisfactory. Suggests combination of electrolytic with chemical process.

Investigation of Boiler-Water Treatment, R. E. Hall. Power Plant Eng., vol. 28, no. 16, Aug. 15, 1924, pp. 843–845, 2 figs. Boiler-water conditioning viewed from standpoint of chemical equilibria of inorganic salts; details of tests, 42 days with permanently hard water and 76 days of temporary hard water.

Use of Linseed as Water Softener (Emploi de la graine de lin comme anti-tartre), M. Courdurier. Chaleur et Industrie, vol. 5, no. 51, July 1924, pp. 325–329, 3 figs. Test carried out by French Navy; linseed is boiled in steam and used for reducing salt content of sea water; details of process and apparatus used.

Water Purification at the Gennevilliers Central Station (L'épuration de l'eau d'appoint à la Centrale de Gennevilliers), Chaleur et Industrie, vol. 5, no. 50, June 1924, pp. 277–279, 4 figs. Details of feedwater treatment and apparatus used, based on two years' practical working and giving entire satisfaction.

BOILER FURNACES

Air Preheaters. Ljungström's Preheater (Ljungströms luftforvarmer), J. F. Johansen. Ingeniören, vol. 33, no. 28, July 12, 1924, pp. 329–333, 9 figs. Device for continuous transmission of heat of combustion product to fresh air on its way to combustion chamber. Superiority of this device as compared to economizer is emphasized.

Combustion Control. Controlling Combustion by Temperature, G. Simmons. Power Plant Eng., vol. 28, no. 17, Sept. 1, 1924, pp. 906–908, 4 figs. Furnace and exit gas temperatures control dampers and fuel feed through thermocouples.

German. Recent Developments in German Furnace Construction for Steam Boilers (Die neuere Entwicklung des deutschen Feuerungsbaues für Dampfkessel), H. Franke. Archiv für Wärmewirtschaft, vol. 5, no. 7, July 1924, pp. 121–126. Discusses developments before, during, and after war, lignite firing, pulverized-coal firing, etc.

Low-Grade Fuel. Investigation of Chain Grates and Ignition Arches for Low-Grade Fuels (Untersuchungen an Wanderrosten und Zündgewölben für minderwertige Brennstoffe), F. Ebel. Glückauf, vol. 60, nos. 25, 26 and 27, June 21, 28 and July 5, 1924, pp. 507–516, 541–544 and 561–566, 27 figs. Gives results of 3 series of experiments for evaporation tests, analysis of fuel, heat balance, flue-gas analysis; tables of observed and calculated data; conclusions as to requirements of boiler plant firing low-grade fuel.

BOILER OPERATION

High Ratings. Boiler Operation at High Ratings, H. A. Reichenbach. Blast Furnace & Steel Plant, vol. 12, no. 8, Aug. 1924, pp. 354–359, 10 figs. Trumbull Steel Co. combines pulverized coal methods in power and heating furnace; discusses pulverized-coal preparation plant; crushing and raw-coal storage; drying; pulverizing; conveying; remote control for distribution system, etc.

BOILERS

Evaporative Capacity. Evaporative Capacity of Boilers, A. A. Arnold. Mech. Wld., vols. 75 and 76, nos. 1956, 1961, 1963 and 1966, June 27, Aug. 1, 15 and Sept. 5, pp. 405, 69–70, 104–105 and 151. Considers normal evaporative capacity of boilers which may be obtained under usual conditions of working and when circumstances may be regarded as moderately favorable. Gives table showing average evaporation from Lancashire and Cornish boilers according to their heating surface. Stationary locomotive-type boilers, vertical cross-tube boilers, vertical Cochrane boilers and their performances.

Inspection. Coöperation of Inspectors and Power-Plant Engineers in Associations for Steam-Boiler Inspection (Die Zusammenarbeit der Revisions- und Wärmeingenieure bei den Dampfkessel-Ueberwachungs-Vereinen), M. Berner. Wärme, vol. 47, no. 26, June 27, 1924, pp. 301–302. Proposes inspection and thermotechnical work by engineers; points out increased efficiency obtained by employing heat engineers; discusses coöperation between groups of associations, etc.

Locomotive. See LOCOMOTIVE BOILERS.

Waste-Heat. Generating Steam from Waste Heat, C. H. S. Tupholme. Power Plant Eng., vol. 28, no. 18, Sept. 15, 1924, pp. 943–945, 2 figs. Discussion of design of and results of tests on waste-heat boilers, which must be designed to evaporate water almost wholly from heat of convection.

Yarrow. Yarrow Boilers at Londonderry Power Station. Engineering, vol. 118, no. 3057, Aug. 1, 1924, pp. 177–178, 3 figs. Details of Yarrow boilers (large combustion space and straight tubes) and test data; heating surface, 3255 sq. ft.; superheating surface, 410 sq. ft.; economizer surface, 1550 sq. ft.; total grate area, 88.7 sq. ft.

BOILERS, WATER-TUBE

Power-Station. Notes on the Origin and Development of Water-Tube-Boilers for Power Stations, E. Kidwell. Combustion, vol. 11, nos. 2 and 3, Aug. and Sept. 1924, pp. 146–152 and 214–216, 15 figs. Shows origin of a few leading types of boilers used today in American plants and principal influences which shaped their development.

BOMBING

Aerial. Aerial Bombing. Mech. Eng., vol. 46, no. 9, Sept. 1924, pp. 542–545, 1 fig. Further information on subject, dealing with damaging distances for various sizes of bombs, yawing and sight stabilization, tactical requirements for service bomb sights, etc.

BRAKES

Air. Air Brake Investigation by I. C. C. Completed. Ry. Mech. Engr., vol. 98, no. 9, Sept. 1924, pp. 521–523. See also Ry. Age, vol. 77, no. 7, Aug. 16, 1924, pp. 296–297. Report of Interstate Commerce Commission investigation on power brakes for both passenger and freight trains. Adoption of more complete specifications for maintenance and operation are recommended.

BRONZES

High-Tin. Some Experiments on the Effect of Casting Temperature and Heat-Treatment on the Physical Properties of a High-Tin Bronze, F. W. Rowe. Inst. of Metals, Advance paper no. 11, for Mtg. Sept. 8–11, 1924, 7 pp., 12 figs. partly on supp. plates. Describes experiments carried out to gain some idea of mechanical properties of a high-tin bronze under various methods of handling. Alloy used had following nominal percentage composition: copper, 84.00; tin, 15.95; phosphorus, 0.05.

Japanese. Japanese Bronzes (Japanische Bronzen. Zeit. für die Gesamte Giessereipraxis, vol. 45, no. 33, Aug. 17, 1924, pp. 105–106 (Metall). Discusses their characteristics, furnaces used, coloring of alloys, analyses of some old and new bronzes.

C

CALORIMETERS

Steam, Bureau of Standards. Calorimeter for Steam Investigations Developed by Bureau of Standards, P. W. Swain. Power, vol. 60, no. 7, Aug. 12, 1924, pp. 246–248, 7 figs. Developed for A.S.M.E. steam research program, insuring utmost reliability.

CAR HEATING

Steam. Tests with Steam Heating of Passenger Cars (Versuche mit Dampfheizung in Personenzügen), M. Mertz. Glasers Annalen, vol. 94, no. 8, Apr. 15, 1924, pp. 93–109, 30 figs. Details of tests carried out by German Testing Bureau with high-pressure and low-pressure systems and various types of cars in special runs of trains, including a train consisting of 22 cars.

CARBURETORS

Adjustment. Saving Gasoline and Increasing Mileage by Proper Carburetor Adjustment, G. W. Jones and A. A. Straub. U. S. Bur. Mines, Reports of Investigations, serial no. 2616, June 1924, 9 pp., 1 fig. Discusses heat losses due to improper carburetor adjustment.

CARS, FREIGHT

Timber Preservation. Treating Freight Car Timber Will Cut Repairs, H. S. Sackett. Ry. Age, vol. 77, no. 8, Aug. 23, 1924, pp. 337–339, 1 fig. States that preservation of lumber will add equivalent of 100,000 cars through reduced delays.

Trucks. Improved Co-ordinating Six-Wheel Truck. Ry. Age, vol. 77, no. 12, Sept. 20, 1924, pp. 487–489, 5 figs. Describes new truck designed by Boyden Steel Corp., Baltimore, Md., known as type C-2-S, purpose of which is to reduce curve resistance and permit greater vertical flexibility.

CASE-HARDENING

Gases Evolved During. Gases Evolved During Carburization, V. E. Hillman. Iron Age, vol. 114, no. 11, Sept. 11, 1924, pp. 611–614, 8 figs. Chemical study of behavior of five solid commercial compounds. Theory of process.

CAST IRON

Gray, Structure of. Study Structure of Gray Iron, J. W. Bolton. Foundry, vol. 52, no. 16, Aug. 15, 1924, pp. 628–634, 24 figs. Also Iron Trade Rev., vol. 75, no. 9, Aug. 28, 1924, pp. 544–550, 25 figs. Discusses macroscopic and low-power magnification methods which reveal general structure of gray iron and semi-steel; microphotography is considered.

Structural Segregation in Gray Iron, J. A. Bolton. Iron Age, vol. 114, no. 12, Sept. 18, 1924, pp. 685–689, 23 figs. Normal occurrence and practical significance of non-homogeneous structures. Relation to composition and physical properties.

Improvement by Nickel Introduction. Improving Cast Iron by Introduction of Nickel, P. D' Merica. Can. Foundryman, vol. 15, no. 8, Aug. 1924, pp. 14–15 and 21, 3 figs. Nickel improves machinability of castings, particularly of thin section; increases hardness, produces finer grain and increases resistance to oxidation and corrosion. Bibliography.

Pearlitic, Production of. Is the Lanz Method Essential to the Production of Pearlitic Cast Iron? Foundry Trade Jl., vol. 30, no. 417, Aug. 14, 1924, pp. 142–144. Discussion of an article by K. Emmel in Stahl u. Eisen, in which writer asks whether it is indispensable that this particular method should be used in order to get a pearlitic structure in cast iron.

Sulphur in. Sulphur in Cast Iron (Der Schwefel im Gusseisen). Zeit. für die Gesamte Giessereipraxis, vol. 45, no. 33, Aug. 17, 1924, pp. 241–242. Discusses drawbacks of presence of sulphur, recent increase in sulphur content and its causes, and means of reducing it.

Synthetic, Electric-Furnace Manufacture of. Manufacture of Synthetic Foundry Iron in the Electric Furnace, C. E. Sims, C. W. Williams and B. M. Larsen. Foundry Trade Jl., vol. 30, no. 419, Aug. 28, 1924, pp. 183–185. Carburization difficulties; factors governing carburization; type of furnace and method of operation; costs; etc. Paper read before Am. Foundrymen's Assn.

CENTRAL STATIONS

Anthracite-Burning. Burning Anthracite in a Modern Steam Plant, E. E. Rowe. Power, vol. 60, no. 8, Aug. 19, 1924, pp. 292–294, 4 figs. Shows special design of furnace at Amsterdam plant of Adirondack Power & Light Corp. and gives results of series of boiler tests with anthracite.

Diesel-Engined, Operation of. Operating a Diesel Power Plant, R. G. Melrose. Power, vol. 60, no. 9, Aug. 26, 1924, pp. 324–325. Outline of principal sources of operating difficulties experienced with oil engines, together with remedies.

Germany. Electricity Supply of Schleswig-Holstein and West-Mecklenburg (Die Elektrizitätsversorgung Schleswig-Holsteins und West-Mecklenburgs), G. Scheehl. Elektrotechnische Zeit., vol. 45, no. 29, July 17, 1924, pp. 771–774, 1 fig. Details of power stations at Flensburg, Rendsburg, Kiel, Altona, Hamburg, Lübeck, their equipment, connections, etc.

Indiana. Rehabilitation of Two Indiana Plants Increases Efficiency. Power Plant Eng., vol. 28, no. 16, Aug. 15, 1924, pp. 834–842, 12 figs. Central stations at Kokomo and Logansport have been made part of Northern Indiana Power Co. system, permitting them to exchange power back and forth with other plants in this system.

Interconnection. Interconnection of Electrical Systems. Power Plant Eng., vol. 28, no. 18, Sept. 15, 1924, pp. 949–952, 2 figs. Discusses possible distances of transmissions in future, high-tension distribution networks, present-day transmission problems, and one-million-volt line. States that scheme of interconnection which will fully utilize hydraulic resources will undoubtedly show greatest economy.

Pulverized-Fuel Burning. Pulverized Fuel at the Cleveland Electric Illuminating Company's Lake Shore Plant, W. H. Aldrich. Mech. Eng., vol. 46, no. 9, Sept. 1924, pp. 519–520 and (discussion) 520–522 and 545. Data on pulverized-fuel equipment at this plant and experience gained in operation; description of coal-handling and burning apparatus.

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Conveyors, Chain
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Conveyors, Ice
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* Foote Bros. Gear & Machine Co.
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* Jones, W. A. Fdry. & Mach. Co.
* Medart Co.
* Nordberg Mfg. Co.
* Nuttall, R. D. Co.
* Smith & Serrell

Coupling, Shaft (Rigid)
* Allis-Chalmers Mfg. Co.
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* Chain Belt Co.
Cumberland Steel Co.
* Falls Clutch & Machinery Co.
* Farrel Foundry & Machine Co.
* General Electric Co.
Hill Clutch Machine & Fdry. Co.
* Jones, W. A. Fdry. & Mach. Co.
Link-Belt Co.
* Medart Co.
* Royersford Fdry. & Mach. Co.
* Smith & Serrell
Wood's, T. B. Sons Co.

Couplings, Universal Joint
Wood's, T. B. Sons Co.

Coverings, Steam Pipe
Carey, Philip Co.
Johns-Manville (Inc.)

Cranes, Electric Traveling
* Palmer-Bee Co.
* Shepard Electric Crane & Hoist Co.
* Whiting Corporation

Cranes, Floor (Portable)
Lidgerwood Mfg. Co.

Cranes, Gantry
* Brown Hoisting Machinery Co.
Link-Belt Co.
* Whiting Corp'n

Cranes, Hand Power
* Brown Hoisting Machinery Co.
Clyde Iron Works Sales Co.
* Palmer-Bee Co.
* Shepard Electric Crane & Hoist Co.
* Whiting Corp'n

Cranes, Jib
* Brown Hoisting Machinery Co.
* Palmer-Bee Co.
* Shepard Electric Crane & Hoist Co.
* Whiting Corp'n

Cranes, Locomotive
* Brown Hoisting Machinery Co.
Link-Belt Co.

Cranes, Locomotive (Crawler)
Link-Belt Co.

Cranes, Pillar
* Brown Hoisting Machinery Co.
* Whiting Corp'n

Cranes, Portable
* Brown Hoisting Machinery Co.
Clyde Iron Works Sales Co.
Link-Belt Co.

Crucibles, Graphite
* Dixon, Joseph Crucible Co.

Crushers, Clinker
* Farrel Foundry & Machine Co.

Crushers, Coal
* Allis-Chalmers Mfg. Co.
* Brown Hoisting Machinery Co.
* Gifford-Wood Co.
Link-Belt Co.
Pennsylvania Crusher Co.
* Smidth, F. L. & Co.
* Worthington Pump & Machinery Corp'n

Crushers, Hammer
Pennsylvania Crusher Co.

Crushers, Jaw
* Farrel Foundry & Machine Co.
* Worthington Pump & Machinery Corp'n

Crushers, Ore and Rock
* Farrel Foundry & Machine Co.
* Nordberg Mfg. Co.
Pennsylvania Crusher Co.

Crushers, Roll
Link-Belt Co.
Pennsylvania Crusher Co.
* Worthington Pump & Machinery Corp'n

Crushing and Grinding Machinery
* Allis-Chalmers Mfg. Co.
* Farrel Foundry & Machine Co.
Pennsylvania Crusher Co.
* Smidth, F. L. & Co.
* Worthington Pump & Machinery Corp'n

Cupolas
* Bigelow Co.
* Whiting Corp'n

Cutters, Bolt
* Landis Machine Co. (Inc.)

Cutters (Bolt, Rod, Rivet, Wire and Chain)
Porter, H. K. (Inc.)

Cutters, Milling
* Whitney Mfg. Co.

Dehumidifying Apparatus
* American Blower Co.
* Carrier Engineering Corp'n

Derricks and Derrick Fittings
Clyde Iron Works Sales Co.
Lidgerwood Mfg. Co.

Diaphragms, Rubber
* United States Rubber Co.

Die Castings
(See Castings, Die Molded)

Die Heads, Thread Cutting (Self-opening)
* Jones & Lamson Machine Co.
* Landis Machine Co. (Inc.)

Dies, Punching
Niagara Machine & Tool Works

Dies, Sheet Metal Working
Niagara Machine & Tool Works

Dies, Stamping
Niagara Machine & Tool Works

Dies, Thread Cutting
* Jones & Lamson Machine Co.
* Landis Machine Co. (Inc.)

Diesel Engines
(See Engines, Oil, Diesel)

Digesters
* Bigelow Co.

Distilling Apparatus
* Vogt, Henry Machine Co.

Drafting Room Furniture
Dietzgen, Eugene Co.
Economy Drawing Table & Mfg. Co.
Keuffel & Esser Co.
New York Blue Print Paper Co.
U. S. Blue Co.
Weber, F. Co. (Inc.)

Drawing Instruments and Materials
Alteneder, Theo. & Sons
Dietzgen, Eugene Co.
Keuffel & Esser Co.
New York Blue Print Paper Co.
U. S. Blue Co.
Weber, F. Co. (Inc.)

Dredges, Hydraulic
* Morris Machine Works

Dredging Machinery
Lidgerwood Mfg. Co.
* Morris Machine Works

Dredging Sleeve
* United States Rubber Co.

Drilling Machines, Sensitive
* Royersford Fdry. & Mach. Co.

Drilling Machines, Vertical
* Royersford Fdry. & Mach. Co.

Drills, Coal and Slate
* General Electric Co.
* Ingersoll-Rand Co.

Drills, Core
* Ingersoll-Rand Co.

Drills, Rock
* General Electric Co.
* Ingersoll-Rand Co.

Drinking Fountains, Sanitary
Johns-Manville (Inc.)

Dryers, Coal
* Grindle Fuel Equipment Co.

Dryers, Rotary
* Bigelow Co.
* Farrel Foundry & Machine Co.
Link-Belt Co.
Sturtevant, B. F. Co.

Drying Apparatus
* American Blower Co.
* Carrier Engineering Corp'n
* Clarage Fan Co.
Sturtevant, B. F. Co.

Dust Collecting Systems
* Allington & Curtis Mfg. Co.
* Allis-Chalmers Mfg. Co.
* Clarage Fan Co.
Sturtevant, B. F. Co.

Dust Collectors
* Allington & Curtis Mfg. Co.
* Allis-Chalmers Mfg. Co.
Sturtevant, B. F. Co.

Dynamometers
* American Schaeffer & Budenberg Corp'n
* General Electric Co.
* Wheeler, C. H. Mfg. Co.

Economizers, Fuel
* Green Fuel Economizer Co.
* Power Specialty Co.
Sturtevant, B. F. Co.

Ejectors
* Schutte & Koerting Co.

Electrical Machinery
* Allis-Chalmers Mfg. Co.
* General Electric Co.
* Westinghouse Electric & Mfg. Co.

Electrical Supplies
* General Electric Co.
Johns-Manville (Inc.)

Elevating and Conveying Machinery
* Brown Hoisting Machinery Co.
* Chain Belt Co.
* Gifford-Wood Co.
* Jones, W. A. Fdry. & Mach. Co.
Link-Belt Co.
* Palmer-Bee Co.

Elevators, Bucket & Chain
Gandy Belting Co.

Elevators, Hydraulic
* Whiting Corp'n

Elevators, Pneumatic
* Whiting Corp'n

Elevators, Portable
* Gifford-Wood Co.
Link-Belt Co.

Elevators, Telescopic
Link-Belt Co.

Emery Wheel Dressers
* Builders Iron Foundry

Engine Repairs
* Franklin Machine Co.
* Nordberg Mfg. Co.

Engine Stops
Golden-Anderson Valve Specialty Co.
* Schutte & Koerting Co.

Engines, Blowing
* Allis-Chalmers Mfg. Co.
Mackintosh-Hemphill Co.
* Nordberg Mfg. Co.
* Worthington Pump & Machinery Corp'n

Engines, Gas
* Allis-Chalmers Mfg. Co.
* De La Vergne Machine Co.
* Ingersoll-Rand Co.
* Titusville Iron Works Co.
* Westinghouse Electric & Mfg. Co.

Engines, Gasoline
Sturtevant, B. F. Co.
* Titusville Iron Works Co.
* Worthington Pump & Machinery Corp'n

Engines, Hoisting
* Allis-Chalmers Mfg. Co.
Clyde Iron Works Sales Co.
Lidgerwood Mfg. Co.
* Morris Machine Works
* Nordberg Mfg. Co.

Engines, Kerosene
* Worthington Pump & Machinery Corp'n

Engines, Marine
Bethlehem Shipbldg.Corp'n(Ltd.)
* Ingersoll-Rand Co.
Johnson, Carlyle Machine Co.
* Nordberg Mfg. Co.
Sturtevant, B. F. Co.
* Worthington Pump & Machinery Corp'n

Engines, Marine, Oil
Bethlehem Shipbldg.Corp'n(Ltd.)
* Ingersoll-Rand Co.
* Nordberg Mfg. Co.

Engines, Marine, Steam
Bethlehem Shipbldg.Corp'n(Ltd.)
* Nordberg Mfg. Co.

Engines, Oil
* Allis-Chalmers Mfg. Co.
Bethlehem Shipbldg.Corp'n(Ltd.)
* De La Vergne Machine Co.
* Ingersoll-Rand Co.
* Nordberg Mfg. Co.
* Titusville Iron Works Co.
* Worthington Pump & Machinery Corp'n

Engines, Oil, Diesel
* Allis-Chalmers Mfg. Co.
Bethlehem Shipbldg.Corp'n(Ltd.)
* Nordberg Mfg. Co.
* Worthington Pump & Machinery Corp'n

Engines, Pumping
* Allis-Chalmers Mfg. Co.
* Ingersoll-Rand Co.
* Morris Machine Works
* Nordberg Mfg. Co.
* Worthington Pump & Machinery Corp'n

Engines, Steam
* Allis-Chalmers Mfg. Co.
* American Blower Co.
Bethlehem Shipbldg.Corp'n(Ltd.)
* Clarage Fan Co.
Clyde Iron Works Sales Co.
* Cole R. D. Mfg. Co.
* Engberg's Electric & Mech. Wks.
* Erie City Iron Works
Harrisburg Fdry. & Mach. Wks.
* Ingersoll-Rand Co.
* Leffel, James & Co.
Lidgerwood Mfg. Co.
Mackintosh-Hemphill Co.
* Morris Machine Works
* Nordberg Mfg. Co.
Ridgway Dynamo & Engine Co.
* Skinner Engine Co.
Sturtevant, B. F. Co.
* Titusville Iron Works Co.
* Troy Engine & Machine Co.
* Vilter Mfg. Co.
* Westinghouse Electric & Mfg. Co.
* Wheeler, C. H. Mfg. Co.

Engines, Steam, Automatic
* American Blower Co.
* Clarage Fan Co.
* Engberg's Electric & Mech. Wks.
* Erie City Iron Works
Harrisburg Fdry. & Mach. Wks.
* Leffel, James & Co.
Ridgway Dynamo & Engine Co.
* Skinner Engine Co.
Sturtevant, B. F. Co.
* Troy Engine & Machine Co.
* Westinghouse Electric & Mfg. Co.

Engines, Steam, Corliss
* Allis-Chalmers Mfg. Co.
* Franklin Machine Co.
* Frick Co. (Inc.)
Harrisburg Fdry. & Mach. Wks.
Mackintosh-Hemphill Co.
* Nordberg Mfg. Co.
* Vilter Mfg. Co.

*Catalogue data of firms marked * appear in the A.S.M.E. Condensed Catalogues of Mechanical Equipment, 1924-25 Volume*

Rural, France. Using Heavy Oil-Engines for Rural Electrification (L'utilisation des moteurs à huile lourde pour l'électrification des campagnes), Y. LeGallou. Revue Générale de l'Electricité, vol. 16, no. 4, July 26, 1924, pp. 147–158, 7 figs. Recommends construction of small and medium centrals with heavy-oil engines for driving generating groups, as is done in Denmark.

CHIMNEYS

Reinforced-Concrete. Monnoyer System of Construction of Reinforced Concrete Stacks (Komíny a nádrze ze železového betonu systému Monnoyerova), J. Polivka. Zprávy Verejné Sluzby Technicke, vol. 6, no. 3, July 1, 1924, pp. 88–95, 10 figs. General discussion including complication of static forces acting on chimney.

Suction Draft for. On Artificial Draft in Steam Boiler Plants (Ueber den künstlichen Zug bei Dampfkesselanlagen), C. Rühl. Wärme- u. Kälte-Technik, vol. 26, no. 15, Aug. 1, 1924, pp. 123–126, 9 figs. Discusses types of drafts and describes evaporator-suction draft plant with Rhomboid regulator (German patent) and its advantages.

COAL

Carbonization. Carbonizing Coal With Regenerated Heat, C. H. S. Tupholme. Chem. & Met. Eng., vol. 31, no. 10, Sept. 8, 1924, pp. 388–389, 1 fig. Description of new type of plant for complete gasification of coal, in which fuel is converted into gas in a single operation, leaving ash, liquor, and tar as residuals, in such a way that a large proportion of potential energy of coal is available as city gas.

Low-Temperature Carbonization of Coal, C. M. Garland. Power, vol. 60, no. 13, Sept. 23, 1924, pp. 490–493, 2 figs. Coal coked evenly and continuously by superheated steam at one pound pressure generated from volatile and residue of coking process. Including fixed charges on investment, cost of treating coal containing 5 per cent moisture is estimated at 80 cents per ton.

Practical Coal Carbonization, F. W. Sperr, Jr. Chem. Age (N. Y.), vol. 32, nos. 6 and 7, June and July 1924, pp. 277–279 and 297–299, 4 figs. Discusses high- and low-temperature carbonization with special reference to American conditions, value of by-products, coke as boiler fuel.

Pulverized. See PULVERIZED COAL.

Relative Plant Values. Relative Plant Values of Coal, K. M. Holaday. Elec. Wld., vol. 84, no. 8, Aug. 23, 1924, pp. 363–365, 1 fig. Shows how heating values, moisture content, ash content, and fusing temperature as determined by laboratory test, in conjunction with a grading table, can assist in comparing fuels of different quality.

COKE

Combustibility of. The Combustibility of Coke, H. Bähr. Colliery Guardian, vol. 128, no. 3320, Aug. 15, 1924, pp. 413–414, 2 figs. Details of design of Bähr's apparatus for determining reactive capacity of coke and combustion apparatus and operations. Translated from Stahl u. Eisen.

Foundry. What Constitutes Good Foundry Coke, H. W. Anderson. Foundry, vol. 52, no. 18, Sept. 15, 1924, p. 717. Results of investigation, giving comparative analyses of different cokes, losses sustained by excessive moisture, etc.

CONDENSERS, STEAM

Design. The Principles of Condenser Design, D. G. McNair. Power Engr., vol. 19, no. 221, Aug. 1924, pp. 304–307, 2 figs. General survey of three main types, showing how their leading dimensions may be roughly determined.

Single- vs. Double-Pass. Single-Pass Condensers Require Less Pumping Power Than Double-Pass, P. Bancel. Power, vol. 60, no. 10, Sept. 2, 1924, pp. 371–372, 2 figs. Neglecting external head, a single-pass condenser requires about one-eighth pumping power for same amount of cooling water as with a double-pass unit. Discusses resistance of external piping and rearrangement of condenser design, so as to utilize single flow to best advantage.

Tubes. Condenser-Tube Packing. Steamship, vol. 36, no. 423, Sept. 1924, pp. 88–91, 10 figs. Shows underlying causes and points out way to satisfactory and economical solution of problem; discusses condenser-tube disintegration, deformation, damage, life of condenser packing and condenser ferrules.

CONVEYORS

Automobile Factory. The Modern Plant as a Production Machine, E. H. Nenning. Am. Mach., vol. 61, no. 7, Aug. 14, 1924, pp. 273–276, 12 figs. Use of conveyors in production of Oldsmobiles; relation of plant layout to production; construction of conveyors equipped with speed reducers and transmissions.

Continuous. Modern Large-Scale Conveying by Means of Continuous Conveyors (Neuzeitlicher Massentransport mit Dauerförderern), M. Buhle. Zeit. des Vereines deutscher Ingenieure, vol. 68, no. 30, July 26, 1924, pp. 777–781, 15 figs. Describes lignite-conveying plants at Kulkwitz mine, briquet-conveyor plant at Voss mine, and coking-coal conveyor plant at Werne mine, built by Bleichert & Co.

Pneumatic. Experimental Investigation of the Process of Pneumatic Conveying (Die experimentelle untersuchung des pneumatischen Fördervorganges), J. Gasterstädt. Forschungsarbeiten auf dem Gebiete des Ingenieurwesens, no. 265, 1924, 76 pp., 10 figs. Results of experiments show that specific conveying pressure is linear function of specific quantity conveyed; examines effect of speed of conveying on this function.

COPPER

Corrosion of. Seventh Report to the Corrosion Research Committee of the Institute of Metals, G. D. Bengough and R. May. Inst. of Metals, Advance paper no. 3, for Mtg. Sept. 8–11, 1924, 176 pp., 35 figs. partly on supp. plates. Deals with corrosion of copper, zinc, 70:30 brass, and condenser tubes. Mainly concerned with mode of formation and behavior of "scales" which form on copper and brass in presence of sea-water.

Hardness Due to Cold Working. Note on the Effect of Progressive Cold-Rolling on the Brinell Hardness of Copper, H. Moore. Inst. of Metals, Advance paper no. 9, for Mtg. Sept. 8–11, 1924, 3 pp., 1 fig. Details of experiments made to confirm conclusion that by severe cold-working a metal could be brought into a state in which its hardness would be little or no higher than that of annealed metal and that in this state metal could not be hardened by further cold-work.

Castings. Making Copper Castings From Cupola Melted Metal, T. F. Jennings. Am. Foundrymen's Assn., Preprint No. 421, for Mtg. Oct. 11–16, 1924, 7 pp. Describes methods used in making sound copper castings by melting metal in a cupola. Preparation of cupola and liberal use of charcoal in charges emphasized.

CORES

Binders. Core Oils—Their Composition and Advantages, W. G. Smith. Can. Foundryman, vol. 15, no. 6, June 1924, pp. 13–16, 5 figs. Discusses binders, not only those in oil group, but those of all classes, putting special emphasis on advantages of properly mixed oils over pure linseed oil; linseed is good base but far from perfect; Chinese oils, corn oil, mineral oil, rosin, and fossil gums when properly blended make ideal core binder. Abstract of paper read before Detroit Foundrymen's Assn.

CORROSION

Prevention. Corrosion Prevention. Machy. Market, no. 1239, Aug. 1, 1924, pp. 17–18, 4 figs. Special reference is made to "bitumastic" specialties which are now made in various shades; black solution is quick drying and has great durability forming impervious film over metal, effectively keeping out causes of corrosion, while cracking and peeling from movement of metal due to change of temperature is entirely prevented by elastic nature of solution.

Tarnishing and. The Relation between Tarnishing and Corrosion, U. R. Evans. Am. Electrochem. Soc., Advance paper no. 6, for Mtg. Oct. 2–4, 1924, pp. 75–100, 7 figs. partly on supp. plate. Describes investigations into attack of gaseous sulphur dioxide on iron and zinc, and that of hydrogen sulphide on copper, with special reference to part played by water in each case, and also to essential difference between tarnishing and corrosion proper.

COSTS

Production. Calculating Cost of Production (Selbstkostenberechnung), E. Schubert. Sparwirtschaft, nos. 9–10 and 11–12, May and June 1924, pp. 49–51 and 57–60. Series of articles based on reports of Cost of Production Committee and giving examples of calculation from new viewpoints.

COUNTERBORES

Manufacture. Manufacturing Interchangeable Counterbores. Machy. (Lond.), vol. 24, no. 619, Aug. 7, 1924, pp. 592–596, 15 figs. Unusual operations and fixtures employed in making counterbores and holders.

COUPLINGS

Shaft. Cast-iron Shrouded Shaft Couplings. Machy. (Lond.), vol. 24, no. 619, Aug. 7, 1924, pp. 582–583, 1 fig. Table giving modern proportions of shaft couplings and additional information that is required when designing a coupling.

CRANES

Cantilever. Cantilever Crane with Combined Counterbalance for Lifting Work and Weight of Load (Auslegerkran mit vereinigtem Hub-Arbeits- und Lasthöhenausgleich), V. Hirschhaut. Fördertechnik u. Frachtverkehr, vol. 17, no. 13, July 8, 1924, pp. 180–181, 1 fig. Details of design of new patent in which load jib is provided with rigid counterweight jib, with chain from drive to load and counterweight, etc.

Harbor. Modern Crane Plants for Waterways, River and Sea Ports and Docks (Neuzeitliche Krananlagen für Wasserstrassen, Binnenund Seehäfen sowie für Werften), K. Zapf. Schiffbau, vol. 25, nos. 19 and 20, July 9 and 23, 1924, pp. 521–525 and 547–550, 18 figs. Details of design and operation of various types of cranes built by the Ardeltwerke.

Locomotive. Locomotive Cranes (Grues per sollevamento locomotive), F. Scheuermann. Ingegneria, vol. 3, no. 8, Aug. 1, 1924, pp. 283–285, 8 figs. Details of design and construction of cranes of capacities of up to 80 tons.

Power-Plant. Types of Cranes for the Power Plant. Power Plant Eng., vol. 28, no. 16, Aug. 15, 1924, pp. 846–848, 4 figs. Crane capacity may be determined by weight of equipment to be installed in future.

Traveling. 1½-Ton Electric Overhead Travelling Crane with Underslung Bridge. Engineering, vol. 118, no. 3057, Aug. 1, 1924, pp. 164–166, 2 figs. Details of crane built by J. Adamson & Co., Hyde, Eng., with underslung bridge for transferring goods from barges on one side of workshop into store sheds on other without traveling longitudinally.

CRANKSHAFTS

Forging. The Forging of Automobile Crankshafts, J. H. Nelson. Forging—Stamping—Heat Treating, vol. 10, no. 9, Sept. 1924, pp. 312–317, 7 figs. Automobile manufacturers are demanding crankshaft forgings that require least amount of machining and which will give nearly perfect dynamic balance. Description of inspection methods necessary to secure best of material and produce desired results. Discusses forging and heat treatment.

Motorcycle. Manufacturing a Motor Cycle Crankshaft. Eng. Production, vol. 7, no. 143, Aug. 1924, pp. 244–247, 22 figs. Detailed consideration of operation, layout and tooling equipment.

D

DIES

Automobile-Fender. Interesting Tools for Drawing Fenders, S. E. Walke. Forging—Stamping—Heat Treating, vol. 10, no. 9, Sept. 1924, pp. 355–356, 8 figs. Describes method used in designing dies for forming crowned automobile fenders having a reversed curve at junction of running board and front fender.

DIESEL ENGINES

Central Stations. Diesel Engine for Stand-By Service, H. L. Conklin. Power Plant Eng., vol. 28, no. 16, Aug. 15, 1924, pp. 851–852, 2 figs. Diesel engine shows lower fuel cost than steam equipment for peak-load service in water-power plant.

Costs. Bids Show Range in Diesel Costs. Mar. Rev., vol. 54, no. 9, Sept. 1924, pp. 347–348, 2 figs. Analysis of bids and of reasons for difference; compares different types of Diesel engines, two- and four-cycle, single- and double-acting, air- and solid-injection.

Design. Calculation of Principal Dimensions of Stationary Diesel Engines (Berechnung der Hauptabmessungen von ortsfesten Dieselmaschinen), A. Balogh. Praktische Maschinen-Konstrukteur, vol. 57, no. 9, Mar. 15, 1924, pp. 101–104, 4 figs. Calculations for 60-hp. stationary Diesel; working of Diesel engines; table of principal dimensions.

Double-Acting. An American Double Acting Diesel. Mar. Eng. & Shipg. Age, vol. 29, no. 9, Sept. 1924, pp. 528–530, 2 figs. See also Pac. Mar. Rev., vol. 21, no. 9, Sept. 1924, pp. 454–455, 2 figs. Details of design and construction of four-cylinder, double-acting, two-cycle Worthington Diesel engine designed to develop 2400 s.hp.

Heavy-Oil-Burning. Burning Boiler Oil in Diesel Engines, C. L. Ruegg. Power, vol. 60, no. 13, Sept. 23, 1924, pp. 488–489, 3 figs. Discusses use in Diesel engines of heavy oil now being burned under boilers. Since price is below that of refined oils, owners of Diesel engines should make necessary rearrangement of fuel system to permit them to take advantage of the situation. Deals with changes necessary.

Marine. Recent Marine Diesel Engines (Neuere Schiffs-Dieselmaschinen), O. P. Kühnle. Schiffbau, vol. 25, no. 19, July 9, 1924, pp. 517–520, 5 figs. Discusses advantages of hot-bulb two-stroke and four-stroke engines, and describes engine built by Motorenwerke, Mannheim, of 1600 hp. and 120 r.p.m., using only 174 g. fuel per hp-hr.

Worthington. Worthington Builds Double-Acting Two-Stroke-Cycle Diesel Engine. Power, vol. 60, no. 12, Sept. 16, 1924, pp. 457–459, 9 figs. Engine combines a fuel economy comparable with that of best existing types of Diesel engine, with dimensions, weight, and construction cost per horsepower approaching those of reciprocating steam machinery. First unit, a single-cylinder engine, is rated at 600 to 800 hp. at speeds of 90 to 120 r.p.m., cylinders being 27 in. in diameter by 40 in. stroke.

DRILLING MACHINES

Slot. A New Duplex Slot Drilling Machine. Machy. (Lond.), vol. 24, no. 620, Aug. 14, 1924, pp. 627–628, 3 figs. Describes latest duplex slot-drilling and keyseating machine built by Smith & Coventry, Ltd., Salford, Eng.; convenience of operation and compactness of design, combined with accessibility of all adjustments, are prominent features. Has single belt drive.

Vertical. Possibilities of Heavy-duty Drilling. Machy. (Lond.), vol. 24, no. 624, Sept. 11, 1924, pp. 737–739, 5 figs. Points out possibilities of vertical heavy-duty box-column drilling machine by presenting examples of work done in automobile plants.

DURALUMIN

Production and Uses. Duralumin, Its Composition and Treatment, S. H. Phillips. Am. Mach., vol. 61, no. 10, Sept. 4, 1924, pp. 371–374, 5 figs. Data concerning production and uses.

DYNAMOMETERS

Torsion. Torsion Dynamometer (Torsionsdynamometer), L. Klein. Zeit. des Vereines deutscher Ingenieure, vol. 68, no. 32, Aug. 9, 1924, pp. 830–831, 4 figs. Describes automatically recording torsion dynamometer for examining rotating machines.

E

ELECTRIC LOCOMOTIVES

Austria. Electric Passenger- and Express-Train Locomotives, Type ICI, Series 1029, of the Austrian Federated Railways (Elektrische Personen- und Schnellzugslokomotiven Bauart ICI, Reihe 1029 der österr. Bundesbahnen), R. Meixner. Elektrotechnik u. Maschinenbau, vol. 42, no. 36, Sept. 7, 1924, pp. 541–549, 5 figs. Details of design, electric and mechanical equipment.

Developments. Recent Developments in Electric

Manufactured by Advertisers — CLASSIFIED LIST OF MECHANICAL EQUIPMENT — Alphabetical List on page 154

Engines, Steam, High Speed
* American Blower Co.
* Clarage Fan Co.
* Engberg's Electric & Mech. Wks.
* Erie City Iron Works
Harrisburg Fdry. & Mach. Wks.
* Nordberg Mfg. Co.
Ridgway Dynamo & Engine Co.
* Skinner Engine Co.

Engines, Steam, Poppet Valve
* Erie City IronWorks
* Nordberg Mfg. Co.
Ridgway Dynamo & Engine Co.
* Skinner Engine Co.
* Vilter Mfg. Co.

Engines, Steam Throttling
* American Blower Co.
* Clarage Fan Co.
* Engberg's Electric & Mech. Wks.
Ridgway Dynamo & Engine Co.
* Skinner Engine Co.

Engines, Steam, Uns-Flow
* Frick Co. (Inc.)
Harrisburg Fdry. & Mach. Wks.
* Nordberg Mfg. Co.
Ridgway Dynamo & Engine Co.
* Skinner Engine Co.

Engines, Steam, Variable Speed
* American Blower Co.
Harrisburg Fdry. & Mach. Wks.
* Nordberg Mfg. Co.
Ridgway Dynamo & Engine Co.
* Skinner Engine Co.

Engines, Steam, Vertical (Fully Enclosed, Self-Oiling)
* American Blower Co.
* Clarage Fan Co.
* Engberg's Electric & Mech. Wks.
* Troy Engine & Machine Co.

Engines, Steering
Bethlehem Shipbldg.Corp'n(Ltd.)
Lidgerwood Mfg. Co.

Evaporators
Bethlehem Shipbldg.Corp'n(Ltd.)
* Croll-Reynolds Engrg. Co. (Inc.)
* Farrel Foundry & Machine Co.
* Vogt, Henry Machine Co.
* Wheeler Condenser & Engrg. Co.

Excavating Machinery
Clyde Iron Works Sales Co.
Lidgerwood Mfg. Co.
Link-Belt Co.

Exhaust Heads
Hoppes Mfg. Co.

Exhaust Systems
* Allington & Curtis Mfg. Co.
* American Blower Co.
* Clarage Fan Co.
Sturtevant, B. F. Co.

Exhausters, Gas
* American Blower Co.
* Clarage Fan Co.
* General Electric Co.
* Green Fuel Economizer Co.
* Ingersoll-Rand Co.
* Schutte & Koerting Co.
Sturtevant, B. F. Co.

Extractors, Centrifugal
Tolhurst Machine Works

Extractors, Oil and Grease
* American Schaeffer & Budenberg Corp'n
* Kieley & Mueller (Inc.)

Fans, Exhaust
* American Blower Co.
* Clarage Fan Co.
* Coppus Engineering Corp'n
* General Electric Co.
* Green Fuel Economizer Co.
Sturtevant, B. F. Co.

Fans, Exhaust, Mine
* American Blower Co.
Sturtevant, B. F. Co.

Feeders, Pulverized Fuel
* Combustion Engineering Corp'n
* Grindle Fuel Equipment Co.
* Smidth, F. L. & Co.

Filters, Feed Water, Boiler
* Permutit Co.

Filters, Feed Water, Demulsifying
* Permutit Co.
Reisert Automatic Water Purifying Co.

Filters, Gravity
* Permutit Co.
Reisert Automatic Water Purifying Co.

Filters, Mechanical
* Permutit Co.

Filters, Oil
* Bowser, S. F. & Co. (Inc.)
Elliott Co.
* General Electric Co.
* Permutit Co.

Filters, Pressure
* Graver Corp'n
* Permutit Co.
Reisert Automatic Water Purifying Co.

Filters, Water
* Cochrane Corp'n
Elliott Co.
* Graver Corp'n
* Permutit Co.
Reisert Automatic Water Purifying Co.
* Scaife, Wm. B. & Sons Co.

Filtration Plants
* Cochrane Corp'n
* Graver Corp'n
International Filter Co.
* Permutit Co.
Reisert Automatic Water Purifying Co.
* Scaife, Wm. B. & Sons Co.

Fire Brick, Fire Hydrants, etc.
(See Brick, Hydrants, Fire, etc.)

Fittings, Ammonia
* Crane Co.
* De La Vergne Machine Co.
* Frick Co. (Inc.)
* Vilter Mfg. Co.
* Vogt, Henry Machine Co.

Fittings, Compression
* Bowser, S. F. & Co. (Inc.)
Lunkenheimer Co.

Fittings, Flanged
* Builders Iron Foundry
* Central Foundry Co.
* Crane Co.
* Edward Valve & Mfg. Co.
* Kennedy Valve Mfg. Co.
Lunkenheimer Co.
* Pittsburgh Valve, Fdry. & Const. Co.
* Reading Steel Casting Co. (Inc.)
(Reading Valve & Fittings Div.)
* U. S. Cast Iron Pipe & Fdry. Co.
* Vogt, Henry Machine Co.

Fittings, Hydraulic
* Crane Co.
* Pittsburgh Valve, Fdry & Const. Co.
* Reading Steel Casting Co. (Inc.)
(Reading Valve & Fittings Div.)
* Vogt, Henry Machine Co.

Fittings, Pipe
* Barco Mfg. Co.
Bethlehem Shipbldg.Corp'n(Ltd.)
* Central Foundry Co.
* Crane Co.
* Kennedy Valve Mfg. Co.
Lunkenheimer Co.
* Pittsburgh Valve, Fdry. & Const. Co.
* Reading Steel Casting Co. (Inc.)
(Reading Valve & Fittings Div.)
Steere Engineering Co.
* Vogt, Henry Machine Co.

Fittings, Steel
* Crane Co.
* Edward Valve & Mfg. Co.
Lunkenheimer Co.
* Pittsburgh Valve, Fdry. & Const. Co.
* Reading Steel Casting Co. (Inc.)
(Reading Valve & Fittings Div.)
Steere Engineering Co.
* Vogt, Henry Machine Co.

Flanges
* American Spiral Pipe Works
* Crane Co.
* Edward Valve & Mfg. Co.
* Kennedy Valve Mfg. Co.
Lunkenheimer Co.
* Pittsburgh Valve, Fdry. & Const. Co.
* Reading Steel Casting Co. (Inc.)
(Reading Valve & Fittings Div.)
* Vogt, Henry Machine Co.

Flanges, Forged Steel
* American Spiral Pipe Wks.
* Cann & Saul Steel Co.

Floor Armor
* Irving Iron Works Co.

Floor Stands
* Chapman Valve Mfg. Co.
* Crane Co.
Hill Clutch Mach. & Fdry. Co.
* Jones, W. A. Fdry. & Mach. Co.
* Kennedy Valve Mfg. Co.
Lunkenheimer Co.
* Pittsburgh Valve, Fdry. & Const. Co.
* Reading Steel Casting Co. (Inc.)
(Pratt & Cady Division)
* Royersford Fdry. & Mach. Co.
* Schutte & Koerting Co.
Wood's, T. B. Sons Co.

Flooring-Grating
* Irving Iron Works Co.

Flooring, Metallic
* Irving Iron Works Co.

Flooring, Rubber
* United States Rubber Co.

Flour Milling Machinery
* Allis-Chalmers Mfg. Co.

Flue Gas Analysis Apparatus
* Tagliabue, C. J. Mfg. Co.

Fly Wheels
Hill Clutch Machine & Fdry. Co.
* Medart Co.
* Nordberg Mfg. Co.
Wood's, T. B. Sons Co.

Forgings, Drop
* Vogt, Henry Machine Co.

Forgings, Hammered
* Cann & Saul Steel Co.

Forgings, Iron and Steel
* Cann & Saul Steel Co.

Foundry Equipment
* Whiting Corp'n

Friction Clutches, Hoists, etc.
(See Clutches, Hoists, etc., Friction)

Friction, Paper and Iron
Link-Belt Co.

Fuel Economizers
(See Economizers, Fuel)

Furnace Construction
* Furnace Engineering Co.

Furnaces, Annealing and Tempering
* Combustion Engineering Corp'n
* General Electric Co.
* Whiting Corp'n

Furnaces, Boiler
* American Engineering Co.
* American Spiral Pipe Wks.
* Babcock & Wilcox Co.
* Bernitz Furnace Appliance Co.
* Combustion Engineering Corp'n
* Detroit Stoker Co.
* Riley, Sanford Stoker Co.

Furnaces, Down Draft
* O'Brien, John Boiler Works Co.

Furnaces, Electric
Detroit Electric Furnace Co.
* Westinghouse Electric & Mfg. Co.

Furnaces, Heat Treating
* Combustion Engineering Corp'n
* General Electric Co.

Furnaces, Melting
* Combustion Engineering Corp'n
Detroit Electric Furnace Co.
* General Electric Co.
* Whiting Corp'n

Furnace, Non-Ferrous
* Combustion Engineering Corp'n
Detroit Electric Furnace Co.

Furnaces, Powdered Coal
* Combustion Engineering Corp'n
* Grindle Fuel Equipment Co.

Furnaces, Smokeless
* American Engineering Co.
* Babcock & Wilcox Co.
* Combustion Engineering Corp'n
* Detroit Stoker Co.
* Riley, Sanford Stoker Co.

Fuses
* General Electric Co.
Johns-Manville (Inc.)
* Westinghouse Electric & Mfg. Co.

Gage Boards
* American Schaeffer & Budenberg Corp'n
* Ashton Valve Co.
* Crosby Steam Gage & Valve Co.

Gage Glasses
* American Schaeffer & Budenberg Corp'n

Gage Glasses, Inclined
Sesure Water Gauge Co.

Gage Testers
* American Schaeffer & Budenberg Corp'n
* Ashton Valve Co.
* Crosby Steam Gage & Valve Co.

Gages, Altitude
* American Schaeffer & Budenberg Corp'n
* Ashton Valve Co.
* Crosby Steam Gage & Valve Co.

Gages, Ammonia
* American Schaeffer & Budenberg Corp'n
* Ashton Valve Co.
* Crosby Steam Gage & Valve Co.
* Vogt, Henry Machine Co.

Gages, Differential Pressure
* American Schaeffer & Budenberg Corp'n
Bacharach Industrial Instrument Co.
* Bailey Meter Co.
* Tagliabue, C. J. Mfg. Co.

Gages, Draft
* American Schaeffer & Budenberg Corp'n
* Ashton Valve Co.
Bacharach Industrial Instrument Co.
* Bailey Meter Co.
* Bristol Co.
* Tagliabue, C. J. Mfg. Co.

Gages, Hydraulic
* American Schaeffer & Budenberg Corp'n
* Ashton Valve Co.
* Crosby Steam Gage & Valve Co.

Gages, Liquid Level
* Bristol Co.
Lunkenheimer Co.
* Simplex Valve & Meter Co.

Gages, Loss of Head
* Builders Iron Foundry
* Simplex Valve & Meter Co.

Gages, Measuring (Surface, Depth, Dial, etc.)
* Norma - Hoffmann Bearings Corp'n

Gages, Pressure
* American Schaeffer & Budenberg Corp'n
* Ashton Valve Co.
Bacharach Industrial Instrument Co.
* Bailey Meter Co.
* Bristol Co.
* Crosby Steam Gage & Valve Co.
* Tagliabue, C. J. Mfg. Co.

Gages, Rate of Flow
Bacharach Industrial Instrument Co.
* Bailey Meter Co.
* Builders Iron Foundry
* Simplex Valve & Meter Co.

Gages, Syphon
* Tagliabue, C. J. Mfg. Co.

Gages, Vacuum
* American Schaeffer & Budenberg Corp'n
* Ashton Valve Co.
Bacharach Industrial Instrument Co.
* Bristol Co.
* Crosby Steam Gage & Valve Co.
* Tagliabue, C. J. Mfg. Co.

Gages, Water
* American Schaeffer & Budenberg Corp'n
* Ashton Valve Co.
* Bristol Co.
* Crane Co.
* Jenkins Bros.
Lunkenheimer Co.
* Reading Steel Casting Co. (Inc.)
(Pratt & Cady Division)
* Simplex Valve & Meter Co.

Gages, Water Level
* American Schaeffer & Budenberg Corp'n
* Bristol Co.
Lunkenheimer Co.
* Simplex Valve & Meter Co.

Gas Plant Machinery
* Cole, R. D. Mfg. Co.
Steere Engineering Co.

Gaskets
* Garlock Packing Co.
* Jenkins Bros.
Johns-Manville (Inc.)
* Sarco Co. (Inc.)

Gaskets, Iron, Corrugated
* Smooth-On Mfg. Co.

Gaskets, Rubber
* Garlock Packing Co.
* Goodrich, B. F. Rubber Co.
* United States Rubber Co.

Gates, Blast
* American Blower Co.
Steere Engineering Co.

Gates, Cut-Off
Link-Belt Co.

Gates, Sluice
* Chapman Valve Mfg. Co.
* Pittsburgh Valve, Fdry. & Const. Co.

Gear Blanks
* Cann & Saul Steel Co.

Gear Cutting Machines
* Jones, W. A. Fdry. & Mach. Co.

Gear Hobbing Machines
* Jones, W. A. Fdry. & Mach. Co.

*Catalogue data of firms marked * appear in the A.S.M.E. Condensed Catalogues of Mechanical Equipment, 1924-25 Volume*

Locomotives, N. W. Storer. Mech. Eng., vol. 46, no. 9, Sept. 1924, pp. 523–528, 9 figs. Describes some of the recent designs of electric locomotives and discusses some of the tendencies in design, especially of mechanical parts.

Dimensions. Connection between Dimensioning of Motors, Gear Arrangement and Maximum Efficiency in Single-Phase Locomotives (Untersuchung der Zusammenhänge über Motordimensionierung, Getriebeanordnung und Grenzleistung bei Einphasenvollbahnlokomotiven), E. Wist. Elektrotechnik, u. Maschinenbau, vol. 42, no. 30, July 27, 1924, pp. 465–468, 1 fig. Abstract of dissertation.

South African Railway. 3,000-Volt Locomotives for South African Railway. Elec. Ry. Jl., vol. 64, no. 11, Sept. 13, 1924, pp. 390–391, 3 figs. Describes locomotives designed for use on narrow-gage line, three 75-ton units being coupled together to haul a 1430-ton freight train.

Switzerland. Electric Locomotives of the Swiss Federal Railways (Die elektrischen Lokomotiven der S. B. B.), M. Weiss. Schweizerische Bauzeitung, vol. 84, no. 2, July 12, 1924, pp. 21–24. Discusses results of locomotive operation, advantages of electric traction so far shown; interruptions and damages to locomotives; cost of maintenance.

ELEVATORS

Electric, Operation of. Operation of Electric Elevator Machines—General Principles, F. A. Annett. Power, vol. 60, no. 11, Sept. 9, 1924, pp. 414–416, 6 figs. Explains operation of semi-magnetic controlled elevators, describes the different automatic stopping devices and tells how to adjust terminal landing limits.

EMPLOYEE REPRESENTATION

Examples of. Discussion on Employee Representation, A. H. Young. Iron Age, vol. 114, no. 12, Sept. 18, 1924, pp. 689–691. Some facts and factors which measure its success. Examples taken from periods of strife.

EMPLOYMENT MANAGEMENT

Apprentices, Placing of. Connection between Suitability Tests and Observation of Capability in Apprentices in the Metal Industry (Zusammenhänge zwischen Eignungsprüfung und Leistungsbeobachtung in der Praxis bei Lehrlingen der Metallindustrie), R. Bolt. Maschinenbau, vol. 3, no. 13, Apr. 10, 1924, pp. 450–454, 5 figs. Discusses practice at Siemens-Schuckert Works for placing apprentices according to ability.

Employee Specifications. Employee Specifications, P. M. Atkins. Indus. Mgt. (N. Y.), vol. 68, no. 2, Aug. 1924, pp. 115–118. Establishing standards similar to those used in purchase of materials.

ESCALATORS

Italy. Escalators for the Urban Station in Naples of the Direct Rome-Naples Line (Scale mobili per il tratto urbano in Napoli della linea direttissima Roma-Napoli), E. D'Andrea. Rivista Tecnica delle Ferrovie Italiane, vol. 25, nos. 5 and 6, May 15 and June 15, 1924, pp. 159–170 and 208–212, 8 figs. Details of design of escalators at stations of Montesanto and Piazza Cavour, also escalators in London stations.

EXTRUSION OF METALS

Brass Rods. The Extrusion of Brass Rod By the Inverted Process, R. Genders. Inst. of Metals, Advance paper no. 6, for Mtg. Sept. 8–11, 1924, 11 pp., 6 figs. partly on supp. plate. Method of overcoming formation of coring defect favored by author consists in completely altering direction of flow in receiver by inverting process, so that die is pressed into billet, rod being extruded through a hollow plunger. Describes experiments carried out on a manufacturing scale with a press designed to extrude by new method.

F

FACTORIES

Location of. How Would You Pick a Factory Location? M. G. Farrell. Factory, vol. 33, no. 3, Sept. 1924, pp. 336–338, 438 and 440–445, 1 fig. Discusses importance of studying thoroughly the various districts when searching for a manufacturing location, when it is profitable to locate in a segregated district, why it is necessary to study labor conditions in district surrounding proposed location, etc.

FANS

Centrifugal. Application and Operation of Centrifugal Fans, R. E. Cramer. Combustion, vol. 11, no. 3, Sept. 1924, pp. 199–201, 3 figs. Analysis of conditions surrounding application and operation of centrifugal fans in boiler plants from viewpoint of influence of fan and its method of control upon capacity and overall economy of plant.

FLAME PROPAGATION

Spark Intensity. Flame Speed and Spark Intensity, D. W. Randolph and F. B. Silsbee. Nat. Advisory Committee for Aeronautics, report no. 187, 1924, 14 pp., 7 figs. Describes series of experiments undertaken to determine whether or not electrical characteristics of igniting spark have any effect on rapidity of flame spread in explosive gas mixture which it ignites. Results show that no such effect exists. Flame velocity in carbon-monoxide-oxygen, acetylene-oxygen, and gasoline-air mixtures was found to be unaffected by changes in spark intensity from sparks which were barely able to ignite mixture up to intense condenser discharge sparks having 50 times this energy.

FLOW OF GASES

Pipes. Pressure Reduction in Smooth Pipes and Coefficient of Flow for Standard Nozzles (Der druckabfall in glatten rohren und die durchflussziffer von normaldüsen), M. Jakob and S. Erk. Forschungsarbeiten auf dem Gebiete des Ingenieurwesens, no. 267, 1924, 28 pp. 17 figs. Discusses determination of large quantities of flowing gases or liquids by measuring pressure drop in constriction (venturi tube, etc.) and gives results of experiments.

FLYING BOATS

Tests. Experiments with Model Flying Boat Hulls. 24th Series Report; Comparison of Longitudinal With Transverse Steps, G. S. Baker and E. M. Keary. Aeronautical Research Committee, no. 893, Aug. 1923, 13 pp., 5 figs. Object of experiments was to test merits or demerits of form having longitudinal instead of transverse steps.

FOUNDRIES

Automobile Castings. Keeping Pace with Auto Output. Foundry, vol. 52, no. 18, Sept. 15, 1924, pp. 718–725, 13 figs. Principal changes that have taken place in plant of Wilson Foundry & Machine Co., Pontiac, Mich., one of the largest foundry plants in world devoted exclusively to production of castings for automobile engines, indicating rapidity of its growth.

Car-Wheel. Make Wheels and Brakeshoes, P. Dwyer. Foundry, vol. 52, no. 18, Sept. 15, 1924, pp. 707–712, 12 figs. Describes plant of Canada Iron Foundries, Ltd., manufacturing cast-iron chilled wheels for railway cars, brakeshoes, and miscellaneous castings, principally municipal work and pipe fittings. Two foundries draw supplies from same stockyard and are served by metal from a battery of four cupolas charged from a common platform.

Cost Accounting. A Foundry Cost System. Foundry Trade Jl., vol. 30, no. 417, Aug. 14, 1924, pp. 157–160. Outlines foundry cost accounting system arranged primarily for iron foundries producing castings of varied designs and of wide range in weight, but underlying principles upon which it is based can be rendered applicable to brass, malleable and steel foundries by changing terminology and altering arrangement of cost details to suit conditions prevailing therein.

Cost Finding in a Foundry, W. J. Corbett. Am. Foundrymen's Assn., Preprint No. 410, for Mtg. Oct. 11–16, 1924, 36 pp., 6 figs. Discusses factors justifying a manufacturer in operating a foundry and uses of an effective cost system. Explains necessity for foundry industry to adopt uniform cost finding methods, and shows the great variations in ascertaining casting costs by comparing figures based on methods used in some 80 steel foundries. Outlines a general cost-accounting system for a foundry with reference in a general way to main elements of foundry costs, and describes in detail a job cost system which furnishes necessary data that should be supplied by a good foundry cost system.

Departmental Costs in the Foundry, H. B. May. Am. Foundrymen's Assn., Preprint No. 415, for Mtg. Oct. 11–16, 1924, 13 pp. Engineering or departmental costs show profit or loss of each unit, whether unit be job, contract, line of product or operating department. Advocates careful analysis of each department to determine correct basis on which to distribute burden. Discusses departments of a foundry to clarify this idea and to show divisions of foundry costs.

Electrified. A Completely Electrified Foundry, E. J. Cipperly. Elec. Wld., vol. 84, no. 11, Sept. 13, 1924, pp. 515–517, 5 figs. Describes plant of Alloy Steel & Metals Co., Los Angeles, Cal., which has been in successful operation for more than a year. Melting, core baking, heat treating and welding all performed electrically.

London, England. A New London Foundry. Foundry Trade Jl., vol. 30, no. 415, July 31, 1924, pp. 92–97, 9 figs. Describes foundry which has recently been started up at North Woolwich Works of Harland & Wolff, Ltd., laid down expressly to meet requirements of extensive ship-repairing and engineering shops which have recently been erected and equipment of which is now completed.

Metallurgical Control in. Metallurgical Control in the Iron Foundry, J. A. Holden. Foundry Trade Jl., vol. 30, no. 420, Sept. 4, 1924, pp. 207–208. Deals separately with controlling light and heavy castings.

Ventilation. Ventilation of Foundries (L'Aération des Fonderies), A. Chanard. Fonderie Moderne, vol. 18, July 1924, pp. 178–184, 17 figs. Details of Chanard-Etoile skylight ventilator system, its construction and application.

FUEL ECONOMY

Temperature Measurement, Importance of. Fuel Economy and the Measurement of High Temperatures, R. Hadfield. Foundry Trade Jl., vol. 30, no. 419, Aug. 28, 1924, pp. 179–181. Survey of fields where pyrometry has enabled accurate heat balances to be obtained, including steam boilers, forge furnaces, furnaces for heat treatment of steel, and open-hearth furnaces. Temperature measurement in France; flame temperature and furnace efficiency; regenerators and recuperators. Abstract of paper read before First World Power Conference.

FUELS

Chemical Composition. Chemical Bases of Fuel Utilization (Die chemischen Grundlagen der Brennstoffverwertung), W. Franckenstein. Zeit. für Technische Physik, vol. 5, no. 7, 1924, pp. 293–299. Discusses fuel analysis, determination of calorific value, volatiles, tar, etc.; distillation of coal and lignite, production of tar, liquid and gaseous fuel.

Relative Value. Relative Value of Fuels, R. O. Wynne-Roberts. Am. Gas Jl., vol. 121, no. 9, Aug. 30, 1924, pp. 791–792 and 806. Discusses heat service, waste incurred in use of all fuels, relative value of gas and other fuels, efficiency of gas of different qualities, etc.

Solid, Test Code for. Test Code for Solid Fuels, Mech. Eng., vol. 46, no. 9, Sept. 1924, pp. 558–562, 5 figs. Preliminary draft of a code in series of nineteen being formulated by A.S.M.E. Committee on Power Test Codes.

(See also COAL; OIL FUEL; PULVERIZED COAL.)

G

GARAGES

Germany. Large-Scale Garage Buildings (Das Gross-Garagenhaus). Automobil-Rundschau, vol. 23, no. 7, July 1, 1924, pp. 91–93, 3 figs. Combination of garage, workshops, and hotel, with capacity of over 1000 automobiles, using individual driveway for each floor as more expeditious than elevators.

GAS PRODUCERS

Developments. Modern Developments in Gas-Producing Plant, F. H. Beebe. Gas Engr., vol. 40, no. 580, Aug. 1924, pp. 172–174, 5 figs. Discusses reduction of back pressure, shorter cycle operation, automatic chargers, fuel feed to generators, waste-heat boilers, and purification process.

GAS TURBINES

Automobiles. The Gas Turbine, Its Use for Automobiles and Airships (La turbine à gaz son utilisation en automobilisme et en aéronautique). Technique Automobile et Aérienne, vol. 15, no. 125, 1924, pp. 33–37, 2 figs. Discusses their efficiency, variation of power, weight per hp.; cycles of constant-volume combustion and constant-pressure combustion; comparison with steam turbines.

GEARS

Calculation, Charts for. Charts for Gear Calculation. F. H. Towler. Machy. (Lond.), vol. 24, no. 622, Aug. 28, 1924, pp. 678–679, 3 charts on supp. plate. Gives charts relating to machine-cut straight-toothed spur and double helical gearing, also pitch-line-velocity chart. Constructed on logarithmic principle.

Cases. Molds Large Iron Gear Cases, P. Dwyer. Foundry, vol. 52, no. 16, Aug. 15, 1924, pp. 623–627, and 652, 10 figs. Detailed description of molding practice involved in production of these large shells in which bulk is out of all proportion to weight.

Involute. Involute Gear Teeth. Automobile Engr., vol. 14, no. 192, Aug. 1924, pp. 237–242, 8 figs. Notes on interference, undercutting, and conditions of contact in spur gears.

Testing. Gear Testing. British Machine Tool Eng., vol. 3, no. 28, July-Aug. 1924, pp. 81–83, 12 figs. Gives methods of testing teeth of gear wheels, illustrating and describing a number of gear-testing jigs.

GRINDING

Chatter Marks. Chatter Marks on Ground Surfaces, D. K. Cole. Machy. (Lond.), vol. 24, no. 620, Aug. 14, 1924, pp. 621–622. Their causes and remedies.

GUN METAL

Admiralty. Some Experiments on the Influence of Casting Temperature and Mass on the Physical Properties of Admiralty Gun-Metal, F. W. Rowe. Inst. of Metals, Advance paper no. 12, for Mtg. Sept. 8–11, 1924, 5 pp., 6 figs. Describes experiments selected from a large number as being typical results obtained in everyday works practice, and made under ordinary works conditions, without any special precautions to insure exceptional purity of metal or abnormal test results.

H

HARDNESS

Brinell Test. Improvements in the Brinell Test on Hardened Steel, Including a New Method of Producing Hard Steel Balls, A. Hultgren. Iron & Steel Inst., Advance paper no. 7, for Mtg. Sept. 1924, 30 pp., 12 figs. partly on supp. plate. Describes a method of producing steel balls considerably harder than those heretofore available, and therefore especially suitable for Brinell tests on hardened steel. Results of Brinell tests on hardened, as well as hardened and tempered steel specimens to determine magnitude of error in hardness number due to permanent flattening of ball. Results of study by different tests of surface hardness and strength of cold-worked balls, as compared with those of other balls of different make and treatment. Use of etched balls suggested as means of increasing accuracy of measuring Brinell impression on hardened steel. Gives conversion table for Brinell numbers and describes a magnetic ball holder.

Pendulum Hardness Tester. Investigations on the Herbert Pendulum Hardness Tester, C. Benedicks and V. Christiansen. Iron & Steel Inst., Advance paper no. 2, for Mtg. Sept. 1924, 20 pp., 7 figs. Construction and working of this new instrument which permits of use of even very small specimens, and comparison of results with those of Brinell method.

Testing. Measuring the Hammer Hardness of Metals by Means of a Herbert Pendulum (Mesure de l'écrouissage des métaux au moyen du pendule Herbert). Bulletin Technique de la Suisse Romande, vol. 50, no. 17, Aug. 16, 1924, pp. 217 and 219, 5 figs. Details of apparatus by means of which hardness is de-

Manufactured by Advertisers — CLASSIFIED LIST OF MECHANICAL EQUIPMENT — Alphabetical List on page 154

Gears, Bakelite
* Foote Bros. Gear & Machine Co.
* Ganschow, Wm. Co.
* Nuttall, R. D. Co.

Gears, Bronze
* Foote Bros. Gear & Machine Co.
* Nuttall, R. D. Co.

Gears, Cut
* Brown, A. & F. Co.
* Chain Belt Co.
* De Laval Steam Turbine Co.
* Farrel Foundry & Machine Co.
* Fawcus Machine Co.
* Foote Bros. Gear & Machine Co.
Hill Clutch Machine & Fdry. Co.
* James, D. O. Mfg. Co.
Johnson, Carlyle Machine Co.
* Jones, W. A. Fdry. & Mach. Co.
Link-Belt Co.
Mackintosh-Hemphill Co.
* Medart Co.
* Nuttall, R. D. Co.
Philadelphia Gear Works

Gears, Fibre
* Foote Bros. Gear & Machine Co.
* General Electric Co.
* James, D. O. Mfg. Co.
* Nuttall, R. D. Co.

Gears, Grinding
* Farrel Foundry & Machine Co.

Gears, Helical
* Farrel Foundry & Machine Co.
* Foote Bros. Gear & Machine Co.
* Nuttall, R. D. Co.

Gears, Herringbone
* Falk Corporation
* Farrel Foundry & Machine Co.
* Fawcus Machine Co.
* Foote Bros. Gear & Machine Co.
* Nuttall, R. D. Co.

Gears, Machine Molded
* Brown, A. & F. Co.
* Farrel Foundry & Machine Co.
* Jones, W. A. Fdry. & Mach. Co.
Link-Belt Co.

Gears, Micarta
* Foote Bros. Gear & Machine Co.
* Westinghouse Electric & Mfg. Co.

Gears, Rawhide
* Farrel Foundry & Machine Co.
* Foote Bros. Gear & Machine Co.
* Ganschow, Wm. Co.
* James, D. O. Mfg. Co.
* Nuttall, R. D. Co.
Philadelphia Gear Works

Gears, Speed Reduction
* Chain Belt Co.
* De Laval Steam Turbine Co.
* Falk Corporation
* Farrel Foundry & Machine Co.
* Fawcus Machine Co.
* Foote Bros. Gear & Machine Co.
* Ganschow, Wm. Co.
* General Electric Co.
Hill Clutch Machine & Fdry. Co.
* James, D. O. Mfg. Co.
* Jones, W. A. Fdry. & Mach. Co.
Kerr Turbine Co.
Link-Belt Co.
* Nuttall, R. D. Co.
* Palmer-Bee Co.
Sturtevant, B. F. Co.
* Westinghouse Electric & Mfg. Co.

Gears, Steel
* Foote Bros. Gear & Machine Co.
Hill Clutch Machine & Fdry. Co.
* Nuttall, R. D. Co.

Gears, Worm
* Chain Belt Co.
* Cleveland Worm & Gear Co.
* Fawcus Machine Co.
* Foote Bros. Gear & Machine Co.
* Ganschow, Wm. Co.
* Gifford-Wood Co.
* James, D. O. Mfg. Co.
* Jones, W. A. Fdry. & Mach. Co.
Link-Belt Co.
* Nuttall, R. D. Co.

Generating Sets
* Allis-Chalmers Mfg. Co.
* American Blower Co.
* Clarage Fan Co.
* Coppus Engineering Corp'n
* De Laval Steam Turbine Co.
* Engberg's Electric & Mech. Wks.
* General Electric Co.
Kerr Turbine Co.
Ridgeway Dynamo & Engine Co.
Sturtevant, B. F. Co.
* Westinghouse Electric & Mfg. Co.

Generators, Electric
* Allis-Chalmers Mfg. Co.
* De Laval Steam Turbine Co.
* Engberg's Electric & Mech. Wks.
General Electric Co.
* Nordberg Mfg. Co.
Ridgway Dynamo & Engine Co.
* Westinghouse Electric & Mfg. Co.

Governors, Air, Compressor
Foster Engineering Co.
* Mason Regulator Co.

Governors, Engine, Oil
* Nordberg Mfg. Co.

Governors, Engine, Steam
* Nordberg Mfg. Co

Governors, Oil Burner
Foster Engineering Co.
* Mason Regulator Co.

Governors, Pressure
* Tagliabue, C. J. Mfg. Co.

Governors, Pump
* Bowser, S. F. & Co. (Inc.)
* Edward Valve & Mfg. Co.
Foster Engineering Co.
Kieley & Mueller (Inc.)
* Mason Regulator Co.
Squires, C. E. Co.
* Tagliabue, C. J. Mfg. Co.

Governors, Steam Turbine
Foster Engineering Co.

Governors, Water Wheel
* Worthington Pump & Machinery Corp'n

Granulators
* Smidth, F. L. & Co.

Graphite, Flake (Lubricating)
* Dixon, Joseph Crucible Co.

Grate Bars
* Casey-Hedges Co.
* Combustion Engineering Corp'n
* Erie City Iron Works
* Titusville Iron Works Co.
* Vogt, Henry Machine Co.

Grate Bars (for Overfeed and Underfeed Stokers)
* Furnace Engineering Co.

Grates, Dumping
* Combustion Engineering Corp'n
* Titusville Iron Works Co.
* Vogt, Henry Machine Co.

Grates, Shaking
* Casey-Hedges Co.
* Combustion Engineering Corp'n
* Erie City Iron Works
* Springfield Boiler Co.
* Titusville Iron Works Co.
* Vogt, Henry Machine Co.

Grating, Flooring
* Irving Iron Works Co.

Grease Cups
(See Oil and Grease Cups)

Grease Extractors
(See Separators, Oil)

Greases
* Dixon, Joseph Crucible Co.
* Royersford Fdry. & Mach. Co.
Vacuum Oil Co.

Grinding Machinery
* Brown, A. & F. Co.
* Smidth, F. L. & Co.

Grinding Machines, Chaser
* Landis Machine Co. (Inc.)

Grinding Machines, Floor
* Builders Iron Foundry
* Royersford Fdry. & Mach. Co.

Gun Metal Finish
* American Metal Treatment Co.

Hammers, Drop
* Franklin Machine Co.
* Long & Allstatter Co.

Hammers, Pneumatic
* Ingersoll-Rand Co.

Handles, Machine, Steel
Rockwood Sprinkler Co.

Hangers, Shaft
* Brown, A. & F. Co.
* Chain Belt Co.
* Falls Clutch & Machinery Co.
Hill Clutch Machine & Fdry. Co.
* Jones, W. A. Fdry. & Mach. Co.
Link-Belt Co.
* Medart Co.
* Royersford Fdry. & Mach. Co.
Wood's, T. B. Sons Co.

Hangers, Shaft (Ball Bearing)
* Hyatt Roller Bearing Co.
* S K F Industries (Inc.)

Hangers, Shaft (Roller Bearing)
* Hyatt Roller Bearing Co.
* Jones, W. A. Fdry. & Mach. Co.

Hard Rubber Products
* United States Rubber Co.

Hardening
* American Metal Treatment Co.

Heat Exchangers
* Croll-Reynolds Engineering Co.

Heat Treating
* American Metal Treatment Co.
* Nuttall, R. D. Co.

Heaters, Feed Water (Closed)
Bethlehem Shipbldg.Corp'n(Ltd.)
* Cochrane Corp'n
* Croll-Reynolds Engineering Co.
* Erie City Iron Works
* Schutte & Koerting Co.
* Walsh & Weidner Boiler Co.
* Wheeler, C. H. Mfg. Co.
* Wheeler Cond. & Engrg. Co.
* Worthington Pump & Machinery Corp'n

Heaters, Feed Water, Locomotive (Open)
* Worthington Pump & Machinery Corp'n

Heaters, Oil
* Power Specialty Co.

Heaters and Purifiers, Feed Water, Metering
* Cochrane Corp'n

Heaters and Purifiers, Feed Water (Open)
* Cochrane Corp'n
Elliott Co.
* Erie City Iron Works
Hoppes Mfg. Co.
* Springfield Boiler Co.
* Wickes Boiler Co.
* Worthington Pump & Machinery Corp'n

Heating and Ventilating Apparatus
* American Blower Co.
* American Radiator Co.
* Clarage Fan Co.
Sturtevant, B. F. Co.

Heating Specialties
Foster Engineering Co.
* Fulton Co.

Heating Specialties, Vacuum
Foster Engineering Co.

Hoisting and Conveying Machinery
* Brown Hoisting Machinery Co.
* Chain Belt Co.
Clyde Iron Works Sales Co.
* Gifford-Wood Co.
* Jones, W. A. Fdry. & Mach. Co.
Lidgerwood Mfg. Co.
Link-Belt Co.
* Shepard Electric Crane & Hoist Co.

Hoists, Air
* Ingersoll-Rand Co.
* Nordberg Mfg. Co.
* Palmer-Bee Co.
* Shepard Electric Crane & Hoist Co.
* Whiting Corp'n

Hoists, Belt
Clyde Iron Works Sales Co.
Lidgerwood Mfg. Co.

Hoists, Chain
* Palmer-Bee Co.

Hoists, Electric
* Allis-Chalmers Mfg. Co.
* American Engineering Co.
* Brown Hoisting Machinery Co.
Clyde Iron Works Sales Co.
* General Electric Co.
Lidgerwood Mfg. Co.
Link-Belt Co.
* Nordberg Mfg. Co.
* Shepard Electric Crane & Hoist Co.

Hoists, Gas and Gasoline
Lidgerwood Mfg. Co.

Hoists, Head Gate
Smith, S. Morgan Co.

Hoists, Locomotive & Coach
* Whiting Corp'n

Hoists, Mine
Lidgerwood Mfg. Co.
* Nordberg Mfg. Co.

Hoists, Skip
* Brown Hoisting Machinery Co.
Lidgerwood Mfg. Co.
Link-Belt Co.
* Palmer-Bee Co.

Hoists, Steam
(See Engines, Hoisting)

Hose, Acid
* United States Rubber Co.

Hose, Air and Gas
* Goodrich, B. F. Rubber Co.
* United States Rubber Co.

Hose, Fire
* United States Rubber Co.

Hose, Gas
* United States Rubber Co.

Hose, Gasoline
* Goodrich, B. F. Rubber Co.
* United States Rubber Co.

Hose, Metal, Flexible
Johns-Manville (Inc.)

Hose, Oil
* United States Rubber Co.

Hose, Rubber
* Goodrich, B. F. Rubber Co.
* United States Rubber Co.

Hose, Steam
* United States Rubber Co.

Hose, Suction
* United States Rubber Co.

Humidifiers
* American Blower Co.
* Carrier Engineering Corp'n
Sturtevant, B. F. Co.

Humidity Control
* American Blower Co.
* Carrier Engineering Corp'n
Sturtevant, B. F. Co.
* Tagliabue, C. J. Mfg. Co.

Hydrants, Fire
* Kennedy Valve Mfg. Co.
* Reading Steel Casting Co. (Inc.)
(Pratt & Cady Division)
* Worthington Pump & Machinery Corp'n

Hydraulic Machinery
* Allis-Chalmers Mfg. Co.
* Ingersoll-Rand Co.
Mackintosh-Hemphill Co.
* Worthington Pump & Machinery Corp'n

Hydraulic Press Control Systems (Oil Pressure)
* American Fluid Motors Co.

Hydrokineters
Bethlehem Shipbldg.Corp'n(Ltd.)
* Schutte & Koerting Co.

Hydrometers
* Tagliabue, C. J. Mfg. Co.

Hygrometers
* Tagliabue, C. J. Mfg. Co.
Weber, F. Co. (Inc.)

Ice Handling Machinery
* Palmer-Bee Co.

Ice Making Machinery
* De La Vergne Machine Co.
* Frick Co. (Inc.)
* Ingersoll-Rand Co.
Johns-Manville (Inc.)
* Nordberg Mfg. Co.
* Vilter Mfg. Co.
* Vogt, Henry Machine Co.

Ice Tools
* Gifford-Wood Co.

Idlers, Belt
Hill Clutch Machine & Fdry. Co
* Smidth, F. L. & Co.

Indicator Posts
* Crane Co.
* Kennedy Valve Mfg. Co.
* Reading Steel Casting Co. (Inc.)
(Pratt & Cady Division)

Indicators, CO_2
Bacharach Industrial Instrument Co.

Indicators, Engine
* American Schaeffer & Budenberg Corp'n
Bacharach Industrial Instrument Co.
* Crosby Steam Gage & Valve Co.

Indicators, Sight Flow
* Bowser, S. F. & Co. (Inc.)

Indicators, Speed
* American Schaeffer & Budenberg Corp'n
Veeder Mfg. Co.

Injectors
* Schutte & Koerting Co.

Injectors, Air
* Croll-Reynolds Engrg. Co.

Instruments, Electrical Measuring
* General Electric Co.
* Westinghouse Electric & Mfg. Co

Instruments, Oil Testing
* Tagliabue, C. J. Mfg. Co.

Instruments, Recording
* American Schaeffer & Budenberg Corp'n
* Ashton Valve Co.
Bacharach Industrial Instrument Co.

*Catalogue data of firms marked * appear in the A.S.M.E. Condensed Catalogues of Mechanical Equipment, 1924-25 Volume*

termined as function of permanent and elastic deformation produced by ball.

HEATING, HOT-AIR

Waste-Heat Utilization. Air Heating by Means of Steam, Exhaust Steam or Other Waste Steam with Blower Operation (Luftheizung mit Dampf, Abdampf oder sonstiger Abwärme und mit Ventilatorbetrieb), K. Redzich. Gesundheits-Ingenieur, vol. 47, no. 30, July 26, 1924, pp. 329–330. Discusses air heaters, low-pressure turbo blowers, operation of heating plant by using any kind of waste steam, air-humidifying plant, etc.

HEATING, STEAM

Central. Applying Centralized Control to Steam Heating Systems. Power, vol. 60, no. 11, Sept. 9, 1924, pp. 417–419, 5 figs. How central-station steam was supplied to an office building and what arrangements were made for heating a factory where public-utility power had supplanted that from a private plant.

Vacuum. Calculation of Vacuum-Steam Pipe Lines by Using Brabbée's Tables (Die Berechnung von Vakuum-Dampfrohrleitungen bei Verwendung der Brabbéeschen Tafeln), A. Weindorfer. Gesundheits-Ingenieur, vol. 47, no. 30, July 26, 1924, pp. 324–325, 2 figs. Gives simple method of calculating steam pipe lines for vacuum heating.

Vacuum Steam Heating Plants [Unterdruckheizungen (Vakuum-Dampfheizungen)], J. Schmitz. Gesundheits-Ingenieur, vol. 47, no. 33, Aug. 16, 1924, pp. 358–362, 2 figs. Describes low-pressure steam-heating plants, comparing them with conventional steam-heating plants; gives table of pipe diameters.

HELICOPTERS

Oehmichen. First Helicopter to Fly a Circular Kilometer. Aviation, vol. 17, no. 7, Aug. 18, 1924, pp. 888–889, 1 fig. Details of apparatus and flight which met test imposed by French Air Service. Translated from Aéronautique.

HOBBING MACHINES

Bevel-Gear. A New Bevel-Gear Hobbing Machine for Producing Theoretically and Practically Exact Helical Teeth (Eine neue Kegelradhobelmaschine zur Erzeugung theoretisch und praktisch genauer Schraubenverzahnung), F. Theimer. Maschinenbau, vol. 3, no. 18, June 26, 1924, pp. 651–653, 5 figs. Describes Brandenberger patent which combines rectilinear movement to and fro of plane with simultaneous rotation of wheel round its axis.

Lees-Bradner. Gear Hobbing Machine Specially Designed for Producing Transmission Gears. Automotive Industries, vol. 51, no. 9, Aug. 28, 1924, pp. 402–404, 5 figs. Describes gear generator specially designed for production of automobile transmission gears, developed by Lees-Bradner Co., Cleveland, O. Straddle housing eliminates overhang of work and hob spindle, and adds rigidity of support, which is claimed to increase speed of production, life of hob and number of gears cut for each sharpening.

HYDRAULIC TURBINES

Draft Tubes. A Rational Form of Draft Tube for Water-Turbines, A. Melovich. Engineering, vol. 118, no. 3057, Aug. 1, 1924, p. 153, 2 figs. Discusses two different kinds of draft tubes at Queenston Power Station, Ont. used for comparison of efficiency, and shows that one draft tube does not fulfill conditions for full bore flow, rendering comparison invalid.

Kaplan. Historical Note on the Kaplan Turbine, J. Kneidl. Engineering, vol. 118, no. 3057, Aug. 1, 1924, p. 183, 1 fig. World Power Conference paper describing new type of water turbine suitable for medium and low heads.

Switzerland. Some Notable Modern Turbine Installations (Quelques installations remarquables de turbines moderne), R. Hoffmann. Bulletin Technique de la Suisse Romande, vol. 50, no. 17, Aug. 16, 1924, pp. 209–214, 7 figs. Details of propeller turbines of Wynau hydroelectric plant, and tests carried out showing their advantages.

HYDROELECTRIC DEVELOPMENTS

N. Y. State Barge Canal. Power Developments in the Barge Canal. Power Plant Eng., vol. 28, no. 17, Sept. 1, 1924, pp. 882–886, 8 figs. Two 8000-hp. water power plants now under construction. Power for lock operations supplied by 32 small plants.

St. Lawrence River. The Development of the St. Lawrence River for Power and Navigation. Engineering, vol. 118, nos. 3059 and 3060, Aug. 15 and 22, 1924, pp. 239–241 and 271–273, 9 figs. See also Can. Engr., vol. 47, nos. 8 and 9, Aug. 19 and 26, 1924, pp. 253–256 and 265, and 277–283, 11 figs. Considers characteristics of Upper St. Lawrence which have an important bearing on design, construction, and operation of development works. Methods of development. Estimates of cost. Paper read before Sec. G of British Assn. at Toronto.

HYDROELECTRIC PLANTS

Design. Great Works Hydro-Electric Plant Has Original Design, R. J. Andrus. Elec. Wld., vol. 84, no. 7, Aug. 16, 1924, pp. 305–307, 7 figs. New automatic station constructed by combining dam, bridge, and building parts for triple use; development cost per kilowatt about $284.

France. Hydroelectric Generating Plant, at Chancy-Pougny (L'usine génératrice hydroélectrique de Chancy-Pougny), A. Tumerelle. Revue Générale de l'Electricité, vol. 16, no. 2, July 12, 1924, pp. 63–71, 12 figs. Details of design, construction, and equipment of plant of capacity of 35,000 kva. from five 7000-kva. alternators. Voltage of 11,000 raised to 120,000 for transmission to Ecuisses by double three-phase line.

Ice Control. Combating Ice in European Hydro-Electric Plant. Eng. News-Rec., vol. 93, no. 7, Aug. 14, 1924, pp. 265–266. Abstract of papers read by A. Frey and Arvid Ruths at First World Power Conference, Lond., dealing with methods employed in Norway and Sweden, chief sources of trouble, ice pressure, and effects of regulation.

Ice Control Methods at Shelburne Falls, J. H. Kennedy. Power Plant Eng., vol. 28, no. 17, Sept. 1, 1924, pp. 895–896, 5 figs. Constant work is required to keep channels open and units running up to capacity on Deerfield River in Massachusetts at plants of New England Power Co. Abstract of article in Contact, May 1924.

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ICE PLANTS

Charleston, W. Va. Performance of a Modern Ice Plant. South. Engr., vol. 41, no. 7, Sept. 1924, pp. 35–39, 5 figs. Gives operating results of 100-ton ice-making plant of Diamond Ice & Coal Co., Charleston, W. Va.

Oil-Engine-Driven. Ice Plant Changes to Oil Engine Drive. Power Plant Eng., vol. 28, no. 17, Sept. 1, 1924, pp. 910–912, 5 figs. How Pure Water Ice Co. at Waukegan, Ill., reduced operating costs so it readily competes with natural-ice producers.

INDUSTRIAL MANAGEMENT

Budgetary Control. Budgetary Control, W. Carswell. Paper Trade Jl., vol. 79, no. 7, Aug. 14, 1924, pp. 51–54 and 60. Outlines general principles of budgetary control in relation to all principal activities of an enterprise which apply with equal value to any business whether manufacturing, trading or merchandising, treating subject in its application to all activities of the business. Discussed under following heads: Advantages to be gained by operating under a budget; Preparation of budget; Control. Address before Can. Soc. Cost Accountants.

Control Method. Efficiency Cards, a Means of Operating Control and Precalculation (Die Leistungskarte, ein Mittel der Betriebskontrolle und der Vorrechnung), M. Krage. Maschinenbau, vol. 3, no. 21, Aug. 14, 1924, pp. 786–790. Efficiency card collects data on material and time consumed in course of production from store cards and time cards; compares operations and actual expenditure in time and materials with estimates given.

Drafting Department. Putting the Drafting Room on a Production Basis, W. E. Irish. Indus. Mgt. (N. Y.), vol. 68, no. 2, Aug. 1924, pp. 121–126, 2 figs. A system which, being based on fundamentals, is flexible enough for wide application.

Inspectors' Card Systems. A Card System to Help the Inspector, K. H. Crumrine. Am. Mach., vol. 61, no. 9, Aug. 28, 1924, pp. 349–350, 4 figs. How inspector can be aided by engineering department.

Planning. The Problem of Planning and Its Solution (Das Problem der Vorkalkulation und seine Lösung), K. Hegner. Zeit. des Vereines deutscher Ingenieure, vol. 68, no. 32, Aug. 9, 1924, pp. 821–824. Object of modern planning system to fix time of production and to improve methods of production; standardizing bases of methods of calculation, etc.

Planning Department. The Planning Department (Das Konstruktionsbüro), H. Menge, A. Eckers, O. Hoffman and L. Voigt. Maschinenbau, vol. 3, no. 19, July 10, 1924, pp. 679–703, 14 figs. Series of articles covering object and importance of planning department; index to drawings; systematic grouping of machine parts on basis of function, etc.; drawing machines, etc.

Psychology in Industry. Industrial Psychology, H. S. Person. Taylor Soc.—Bul., vol. 9, no. 4, Aug. 1924, pp. 163–171. Discusses psychology as science of nature and causes of conduct and of its control, and problems of psychology in industry.

Quality Measurement. Measurement of the Quality of Product, G. S. Radford. Mech. Eng., vol. 46, no. 9, Sept. 1924, pp. 546–547 (includes discussion). Considers possibility of reducing control of quality and inspection function to a mathematical basis, and concludes that this is neither feasible nor desirable. Sets up standards by which performance of inspection division can be judged.

Statistical Investigation. Mass-Number Investigation, Reliability of Technical Measurements, and Dispersion (Grosszahlforschung, Zuverlässigkeit technischer Messungen und Streuungsmasse), G. Sachs. Stahl u. Eisen, vol. 44, no. 32, Aug. 7, 1924, pp. 941–946, 6 figs. Discusses statistical treatment of investigations and their results; frequency curves of numbers of tests.

Steel Foundry. Organization and Practice in a Steel Foundry Finishing Department, C. W. Heywood. Am. Foundrymen's Assn., Preprint No. 422, for Mtg. Oct. 11–16, 1924, 11 pp. Believes gang system produces most satisfactory results from standpoint of both output and costs. Where gang system is not feasible, another successful plan is to employ a pacemaker. Layout of equipment has a great deal to do with best routing and these two features are discussed in detail.

Stores Management. Stores Management in Machine Shops and Costs, (Materialverwaltung in Maschinenfabriken unter entsprechender Berücksichtigung der Selbstkostenerfassung), F. Strauch. Maschinenbau, vol. 3, no. 20, July 24, 1924, pp. W151–W153. Discusses management with view to cost reduction and economic use of materials, and to keep track of costs of materials.

Textile Mills. Significant Savings in Textile Mill Operations, N. T. Thomas. Taylor Soc.—Bul., vol. 9, no. 4, Aug. 1924, pp. 172–176. Results of substitution of scientific management for tradition in Jackson Mills.

Time Recording. Control of Work Time (Kontrolle der Arbeitszeit), F. Schleif. Maschinenbau, vol. 3, no. 13, Apr. 10, 1924, pp. 440–441, 7 figs. Details of system and apparatus for accurate time recording.

Time Study. See TIME STUDY.

INDUSTRIAL ORGANIZATION

Machine Shops. Working Organization of a Machine Shop and Iron Foundry (Betriebsorganisation einer Maschinenfabrik und Eisengiesserei), W. Bischoff. Maschinenbau, vol. 3, no. 13, Apr. 10, 1924, pp. 445–450, 11 figs. Explains inner organization of machine works by means of card system used.

INSULATORS, HEAT

Steam Pipe. Removable Insulating Covers (Manchons calorifuges amovibles), H. and L. Faron. Revue Industrielle, vol. 54, no. 2181, Aug. 1924, pp. 233–235, 8 figs. Details of patented removable sectional insulation or insulating jackets, their composition, making of joints and advantages.

INTERNAL-COMBUSTION ENGINES

Applications. Present Applications of Internal-Combustion Engines (Les applications actuelles des moteurs à combustion interne), A. Witz. Technique Moderne, vol. 16, no. 15, Aug. 1, 1924, pp. 501–509, 5 figs. Discusses use of engines up to 100 hp. in small industries, and up to 2300 hp. in medium- and large-scale industries; fuels; types of engines; engines for central stations, for metallurgy, for traction and driving airplanes.

Fuels. Contribution to the Theory of Fuels for Engines (Contribution à la théorie des combustibles pour les moteurs), M. Brutzkus. Société d'Encouragement pour l'Industrie Nationale—Bul., vol. 136, no. 5, May 1924, pp. 397–425, 1 fig. Discusses combustion-engine fuels, including mineral oils, tar oils, gaseous fuel; fuel increasing and decreasing in volume; efficiency of combustion.

Decomposition of Lead Tetraethyl and Its Use in Explosion Engines (Sur la décomposition du plomb tétraéthyle et son application aux moteurs à explosion), P. Jolibois and G. Normand. Académie des Sciences—Comptes rendus des séances, vol. 179, no. 1, July 7, 1924, pp. 27–28. This fuel allows increase of compression and reduces chances of spontaneous explosion of gaseous mixture.

Lignite Distillate, Chas. E. Kerchner. Mech. Eng., vol. 46, no. 9, Sept. 1924, pp. 516–518, 4 figs. Its possibilities as an internal-combustion-engine fuel. Data on tests made with a small Hvid engine operating on lignite oil, as compared with gas oil and kerosene. Shown to be an efficient and likely fuel.

Residues, Formation of. Formation of Residues in Superheated-Steam Engines and Internal-Combustion Engines and Their Prevention (Die Rückstandsbildung in Heissdampfmaschinen und Verbrennungskraftmaschinen und ihre Verhütung), G. Spettmann. Praktische Maschinen-Konstrukteur, vol. 57, no. 22, June 17, 1924, pp. 309–310. Discusses producer-gas and Diesel engines, gas residues and their combination with lubricating oil, complete combustion of fuel, etc.

Supercharging. Supercharger Pros and Cons, W. G. Aston. Autocar, vol. 53, no. 1507, Sept. 5, 1924, pp. 413–416, 3 figs. Considers advantages and disadvantages of latest development in internal-combustion engine design; shows supercharger has far wider potentialities and discusses advantages that may accrue from its general adoption.

Temperature-Entropy Diagram. A Modified Temperature-Entropy Diagram for a Gaseous Working Substance, G. E. Scholes. Engineering, vol. 118, no. 3059, Aug. 15, 1924, pp. 215–216, 1 fig. Construction of chart. Transference of indicator diagram to $T\phi$ chart.

(See also AIRPLANE ENGINES; AUTOMOBILE ENGINES; DIESEL ENGINES; OIL ENGINES.)

IRON

Electrolytic. Electrolytic Iron. Iron & Coal Trades Rev., vol. 109, no. 2942, July 18, 1924, pp. 117–118. Discusses processes for commercial production of electrolytic iron in tubes, sheets, etc., i.e., with anodes formed and soluble anodes shaped but insoluble, anodes soluble but unformed. Abstract of paper read before World Power Conference.

IRON AND STEEL

Canadian Industry. The Iron and Steel Industry in Canada, C. S. Cameron. Engineer, vol. 138, nos. 3578 and 3579, July 25 and Aug. 1, 1924, pp. 112–113 and 128–129. History of industry and account of resources and present condition. Paper presented to Empire Min. & Met. Congress.

Corrosion Prevention. Prevention of Corrosion of Iron and Steel, C. P. Perin. Engrs. & Eng., vol. 41, no. 8, Aug. 1924, pp. 223–225. Gives diagram showing causes external and those inherent in metal, general theory and prevention of corrosion.

IRON CASTINGS

Green-Sand. New Ways of Producing Castings in Green Sand (Neue Wege in der Herstellung von Gusstücken mit grünen Kernen), M. Freytag. Giesserei-Zeitung, vol. 21, no. 14, July 15, 1924, pp. 302–306, 13 figs. Detailed description and illustrations of new method for producing small castings in quantities.

Production Cost Finding. Finding Actual Cost of Castings, G. B. Cocker. Iron Trade Rev., vol. 75, no. 7, Aug. 14, 1924, pp. 421–422. System devised by southern foundry for determining selling price. Two factors used, namely, actual time required to

Manufactured by Advertisers — CLASSIFIED LIST OF MECHANICAL EQUIPMENT — Alphabetical List on page 154

* Bailey Meter Co.
* Bristol Co.
* Builders Iron Foundry
* Crosby Steam Gage & Valve Co.
* General Electric Co.
* Tagliabue, C. J. Mfg. Co.
* Westinghouse Electric & Mfg. Co.

Instruments, Scientific
Weber, F. Co. (Inc.)

Instruments, Surveying
Dietzgen, Eugene Co.
Keuffel & Esser Co.
New York Blue Print Paper Co.
U. S. Blue Co.
Weber, F. Co. (Inc.)

Insulating Materials (Electrical)
* General Electric Co.
Johns-Manville (Inc.)

Insulating Materials (Heat and Cold)
Carey, Philip Co.
* Celite Products Co.
Johns-Manville (Inc.)
* King Refractories Co. (Inc.)
* Quigley Furnace Specialties Co.

Insulation, Boiler
Carey, Philip Co.
* Celite Products Co.

Insulation, Heat
Carey, Philip Co.

Joints, Expansion
Carey, Philip Co.
* Crane Co.
* Croll-Reynolds Engineering Co.
Hamilton Copper & Brass Works
Lunkenheimer Co.
* Pittsburgh Valve, Fdry. & Const. Co.
* United States Rubber Co.
* Wheeler, C. H. Mfg. Co.

Joints, Flanged Pipe
* Crane Co.
* Pittsburgh Valve, Fdry. & Const. Co.

Joints, Flexible
* Barco Mfg. Co.

Joints, Swing and Swivel
* Barco Mfg. Co.
Lunkenheimer Co.

Kettles, Steam Jacketed
* Cole, R. D. Mfg. Co.
* Nordberg Mfg. Co.
* Titusville Iron Works Co.

Keys, Machine
* Smith & Serrell
* Whitney Mfg. Co.

Keyseating Machines
* Whitney Mfg. Co.

Kilns, Dry (Brick, Lumber, Stone, etc.)
* American Blower Co.
Sturtevant, B. F. Co.

Ladles
* Whiting Corp'n

Lamps, Incandescent
* General Electric Co.
Johns-Manville (Inc.)
* Westinghouse Electric & Mfg. Co.

Land-Clearing Machinery
Clyde Iron Works Sales Co.

Lathes, Automatic
* Jones & Lamson Machine Co.

Lathes, Brass
* Warner & Swasey Co.

Lathes, Chucking
* Jones & Lamson Machine Co.

Lathes, Engine
* Builders Iron Foundry

Lathes, Turret
* Jones & Lamson Machine Co.
* Warner & Swasey Co.

Levers, Flexible (Wire)
* Gwilliam Co.

Lifts, Lumber
Leitelt Iron Works

Lighting Equipment
* Westinghouse Electric & Mfg. Co.

Linings, Brake
Johns-Manville (Inc.)

Linings, Furnace
Johns-Manville (Inc.)

Linings, Furnace
* Celite Products Co.
Johns-Manville (Inc.)
* King Refractories Co. (Inc.)
* McLeod & Henry Co.
* Quigley Furnace Specialties Co.

Linings, Stack
Johns-Manville (Inc.)

Loaders, Portable
* Gifford-Wood Co.
Link-Belt Co.

Locomotives, Electric
* General Electric Co.
* Westinghouse Electric & Mfg. Co.

Locomotives, Storage Battery
* General Electric Co.
* Westinghouse Electric & Mfg. Co.

Logging Machinery
Clyde Iron Works Sales Co.
Lidgerwood Mfg. Co.

Lubricants
* Dixon, Joseph Crucible Co.
* Royersford Fdry. & Mach. Co.
Vacuum Oil Co.

Lubricating Systems
* Bowser, S. F. & Co. (Inc.)
Lunkenheimer Co.

Lubricators, Cylinder
* Bowser, S. F. & Co. (Inc.)
Lunkenheimer Co.

Lubricators, Force-Feed
* Bowser, S. F. & Co. (Inc.)
Lunkenheimer Co.

Lubricators, Hydrostatic
* Crosby Steam Gage & Valve Co.
Lunkenheimer Co.

Lubricators (Sight Feed)
* Crosby Steam Gage & Valve Co.
Lunkenheimer Co.

Machine Tool Feed Control Systems (Oil Pressure)
* American Fluid Motors Co.

Machine Work
* Brown, A. & F. Co.
* Builders Iron Foundry
* Farrel Foundry & Machine Co.
* Franklin Machine Co.
Hill Clutch Machine & Fdry. Co.
Johnson, Carlyle Machine Co.
* Jones, W. A. Fdry. & Mach. Co.
Lammert & Mann Co.
Link-Belt Co.
* Nordberg Mfg. Co.

Machinery
(Is classified under the headings descriptive of character thereof)

Manometers
* American Blower Co.
Bacharach Industrial Instrument Co.
* Simplex Valve & Meter Co.

Mechanical Draft Apparatus
* American Blower Co.
* Clarage Fan Co.
* Coppus Engineering Corp'n
* Green Fuel Economizer Co.
Sturtevant, B. F. Co.

Mechanical Stokers
(See Stokers)

Metal Treating
* American Metal Treatment Co.

Metals, Perforated
* Hendrick Mfg. Co.

Meters, Air and Gas
Bacharach Industrial Instrument Co.
* Bailey Meter Co.
* Builders Iron Foundry
* General Electric Co.

Meters, Boiler Performance
* Bailey Meter Co.

Meters, Condensation
* Simplex Valve & Meter Co.

Meters, Electric
* General Electric Co.
* Shepard Electric Crane & Hoist Co.
* Westinghouse Electric & Mfg. Co.

Meters, Feed Water
* Bailey Meter Co.
* Builders Iron Foundry
* Cochrane Corp'n
* General Electric Co.
Hoppes Mfg. Co.
* Simplex Valve & Meter Co.
* Worthington Pump & Machinery Corp'n

Meters, Flow
Bacharach Industrial Instrument Co.
* Bailey Meter Co.
* Cochrane Corp'n
* General Electric Co.
* Simplex Valve & Meter Co.

Meters, Oil
* Bowser, S. F. & Co. (Inc.)
* Cochrane Corp'n
* General Electric Co.
* Simplex Valve & Meter Co.
* Worthington Pump & Machinery Corp'n

Meters, Pitot Tube
* American Blower Co.
* Simplex Valve & Meter Co.

Meters, Steam
* Bailey Meter Co.
* Builders Iron Foundry
* Cochrane Corp'n
* General Electric Co.

Meters, V-Notch
* Bailey Meter Co.
* Cochrane Corp'n
* General Electric Co.

Meters, Venturi
* Builders Iron Foundry
* National Meter Co.
* Simplex Valve & Meter Co.

Meters, Water
* Cochrane Corp'n
* General Electric Co.
Hoppes Mfg. Co.
* National Meter Co.
* Simplex Valve & Meter Co.
* Worthington Pump & Machinery Corp'n

Milling and Drilling Machines (Combined)
Universal Boring Machine Co.

Milling Machines, Hand
* Whitney Mfg. Co.

Milling Machines, Keyseat
* Whitney Mfg. Co.

Milling Machines, Plain
* Warner & Swasey Co.

Mills, Ball
* Allis-Chalmers Mfg. Co.
* Smidth, F. L. & Co.
* Worthington Pump & Machinery Corp'n

Mills, Blooming and Slabbing
Mackintosh-Hemphill Co.

Mills, Grinding
* Farrel Foundry & Machine Co.
* Smidth, F. L. & Co.

Mills, Sheet and Plate
Mackintosh-Hemphill Co.

Mills, Structural, Rail and Bar
Mackintosh-Hemphill Co.

Mills, Tube
* Allis-Chalmers Mfg. Co.
* Smidth, F. L. & Co.
* Worthington Pump & Machinery Corp'n

Mining Machinery
* Allis-Chalmers Mfg Co.
* General Electric Co.
* Ingersoll-Rand Co.
* Worthington Pump & Machinery Corp'n

Monel Metal
Driver-Harris Co.

Monorail Systems
(See Tramrail Systems, Overhead)

Motor-Generators
* Allis-Chalmers Mfg. Co.
* General Electric Co.
Ridgway Dynamo & Engine Co.
* Westinghouse Electric & Mfg. Co.

Motors, Electric
* Enberg's Electric & Mech. Wks.
* General Electric Co.
Master Electric Co.
Ridgway Dynamo & Engine Co.
* Shepard Electric Crane & Hoist Co.
Sturtevant, B. F. Co.
* Westinghouse Electric & Mfg. Co.

Motors, Synchronous
Ridgway Dynamo & Engine Co.

Nickel, Sheet
Driver-Harris Co.

Nipple Threading Machines
* Landis Machine Co. (Inc.)

Nitrogen Gas
* Linde Air Products Co.

Nozzles, Blast
* Schutte & Koerting Co.

Nozzles, Sand and Air
Lunkenheimer Co.

Nozzles, Spray
* Cooling Tower Co. (Inc.)
* Schutte & Koerting Co.

Odometers
Veeder Mfg. Co.

Ohmeters
* General Electric Co.

Oil and Grease Cups
* Bowser, S. F. & Co. (Inc.)
* Crane Co.
Lunkenheimer Co.

Oil and Grease Guns
* Royersford Fdry. & Mach. Co.

Oil Burning Equipment
Bethlehem Shipbldg.Corp'n(Ltd.)
* Combustion Engineering Corp'n
* Schutte & Koerting Co.

Oil Filtering and Circulating Systems
* Bowser, S. F. & Co. (Inc.)

Oil Mill Machinery
* Worthington Pump & Machinery Corp'n

Oil Refinery Equipment
Bethlehem Shipbldg.Corp'n(Ltd.)
* Vogt, Henry Machine Co.

Oil Storage and Distributing Systems
* Bowser, S. F. & Co. (Inc.)

Oil Well Machinery
* Ingersoll-Rand Co.
* Titusville Iron Works Co.
* Worthington Pump & Machinery Corp'n

Oiling Devices
* Bowser, S. F. & Co. (Inc.)
Lunkenheimer Co.

Oiling Systems
* Bowser, S. F. & Co. (Inc.)
Lunkenheimer Co.

Oils, Lubricating
Vacuum Oil Co.

Ore Handling Machinery
* Brown Hoisting Machinery Co.
* Chain Belt Co.
Link-Belt Co.

Ovens, Core
* Whiting Corporation

Oxy-Acetylene Supplies
* Linde Air Products Co.

Oxygen Gas
* Linde Air Products Co.

Packing, Ammonia
France Packing Co.
* Garlock Packing Co.
* Goodrich, B. F. Rubber Co.
* United States Rubber Co.

Packing, Asbestos
* Garlock Packing Co.
* Goodrich, B. F. Rubber Co.
Johns-Manville (Inc.)

Packing, Centrifugal Pump
* Garlock Packing Co.

Packing, Hydraulic
France Packing Co.
* Garlock Packing Co.
* Goodrich, B. F. Rubber Co.
Johns-Manville (Inc.)

Packing, Metallic
France Packing Co.
* Garlock Packing Co.
Johns-Manville (Inc.)

Packing, Rod (Piston and Valve)
France Packing Co.
* Garlock Packing Co.
* Goodrich, B. F. Rubber Co.
* Jenkins Bros.
Johns-Manville (Inc.)
* United States Rubber Co.

Packing, Rubber
* Garlock Packing Co.
* Goodrich, B. F. Rubber Co.
* Jenkins Bros.
Johns-Manville (Inc.)
* United States Rubber Co.

Packing, Sheet
* Garlock Packing Co.
* Goodrich, B. F. Rubber Co.
* Jenkins Bros.
Johns-Manville (Inc.)
* United States Rubber Co.

Paint, Metal
* Dixon, Joseph Crucible Co.
* General Electric Co.
Johns-Manville (Inc.)

Paints, Concrete (For Industrial Purposes)
* Smooth-On Mfg. Co.

Panel Boards
* Westinghouse Electric & Mfg. Co.

Paper, Drawing
Alteneder, Theo. & Sons
Dietzgen, Eugene Co.
Keuffel & Esser Co.
New York Blue Print Paper Co.
U. S. Blue Co.
Weber, F. Co. (Inc.)

Paper, Sensitized
Alteneder, Theo. & Sons
Dietzgen, Eugene Co.
Keuffel & Esser Co.
New York Blue Print Paper Co.
U. S. Blue Co.
Weber, F. Co. (Inc.)

Paper Mill Machinery
* Farrel Foundry & Machine Co.

*Catalogue data of firms marked * appear in the A.S.M.E. Condensed Catalogues of Mechanical Equipment, 1924-25 Volume*

produce castings and amount of metal needed to pour them. From paper presented at meeting of Carolina members of Southern Metal Trades Assn. See also Foundry, vol. 52, no. 17, pp. 665–666.

Production Increase. A Shop Laboratory that Improves the Product, C. O. Herb. Machy. (N. Y.), vol. 31, no. 1, Sept. 1924, pp. 1–3, 6 figs. How metallurgical laboratory at Niles Tool Works, Hamilton, O., has helped to produce better castings.

Run-Outs. Run-Outs and Their Remedies, F. C. Edwards. Metal Industry (Lond.), vol. 25, no. 9, Aug. 29, 1924, pp. 203–204, 1 fig. Causes of run-outs, safeguards, and remedies.

L

LIGHTING

Foundries. How to Illuminate Foundries, W. H. Rademacher. Iron Trade Rev., vol. 75, no. 12, Sept. 18, 1924, pp. 741–745, 3 figs. Explains essential differences between hit-or-miss methods and scientific use of modern electric lamps. Benefits derived through better production, with safety.

Machine Shops. Good Lighting Equipment Pays, J. J. McLaughlin. Am. Mach., vol. 61, no. 7, Aug. 14, 1924, pp. 253–256, 9 figs. Advantages of good lighting system; proper position and spacing of units for machine shops; saving through periodical cleaning of equipment.

Textile Mills. Some Problems in the Daylight Lighting of Textile Factories, P. J. Waldram. Illuminating Engr., vol. 17, no. 5, May 1924, pp. 79–87, 12 figs. Deals with lighting needs of cotton industry, and only so far as relates to spinning of raw cotton into yarn and weaving of latter into cloths and sheetings.

LIQUIDS

Density—Temperature Relation. Density of Liquids and Their Temperature (Die Dichte der Flüssigkeit und deren Temperatur), J. J. Saslawsky. Zeit. für Physikalische Chemie, vol. 109, no. 1–2, Apr. 12, 1924, pp. 111–135. Results of investigation to show connection between density (volume) of liquids and their temperature.

LOCOMOTIVE BOILERS

Design. Calculation and Construction of a Locomotive Boiler (Berechnung und Konstruktion eines Lokomotivkessels), E. Herms. Praktische Maschinen-Konstrukteur, vol. 57, nos. 21, 22 and 23, June 10, 17, and 24, 1924, pp. 285–290, 301–305 and 324–326, 26 figs. Complete calculation of locomotive boiler with heating surface of 68.4 sq. m.

Developments. Locomotive Boilers (Notes sur la Chaudière Locomotive), M. Demoulin. Génie Civil, vol. 85, nos. 2 and 3, July 12 and 19, 1924, pp. 34–36, and 59–62, 5 figs. Discusses continued improvements in locomotive operation, boiler developments, variation of power, induced draft, long-distance running, increase in boiler tubes, etc. Process of combustion, feeding fuel, Penn. Ry. tests, conclusions.

LOCOMOTIVES

Diesel-Electric. An Italian Diesel-Electric Locomotive (Una locomotiva italiana Diesel-elettrica), G. Sona. Rivista Tecnica delle Ferrovie Italiane, vol. 25, no. 5, May 15, 1924, pp. 145–158, 9 figs. Details of experiments on Calabro-Lucana line with 440-hp. units constructed by Italian Brown-Boveri and Fiat companies.

Oil-Engined Locomotive Proves Its Worth. Oil Engine Power, vol. 2, no. 8, Aug. 1924, pp. 417–419, 3 figs. 24-hr. operation in Manhattan's busy railroad yards proves satisfactory. Characteristics of engine, which has striking method of fuel distribution, supplement uncanny flexibility of electrical transmission.

Diesel-Engined. Tests of a 60-H.P. Liesel Locomotive on the London & North Eastern Railway. Ry. Gaz., vol. 41, no. 6, Aug. 8, 1924, pp. 178–180 and 193, 6 figs. Describes locomotive which is of Austrian manufacture, 0–4–0 type, and equipped with 60-hp. six-cylinder Diesel engine, which transmits its power through Lentz hydraulic transmission mechanism.

Driving-Box Replacement. Replacement Driving Boxes on the New York Central, L. C. Morrow. Am. Mach., vol. 61, no. 8, Aug. 21, 1924, pp. 309–312, 12 figs. Practice of West Albany shops. Operations on driving boxes, crown brasses, shoes, and wedges.

Electric. See ELECTRIC LOCOMOTIVES.

Mallet. Hungarian Mallet with Brotan Type Boiler. Ry. Age, vol. 77, no. 10, Sept. 6, 1924, pp. 407–410, 4 figs. Describes locomotive built at Budapest by Hungarian State Rys. for heavy freight service between Fiume and Moravica; steam pressure, 220 lb.; total evaporative heating surface, 2918 sq. ft.

Mikado. Mikado Type Locomotive, Elgin Joliet & Eastern Ry. Ry. Rev., vol. 75, no. 9, Aug. 30, 1924, pp. 317–320, 3 figs. Gives weights and dimensions of Elgin, Joliet & Eastern Ry. 2–8–2 type locomotives. Engines are similar in design and construction to U.S.R.A. heavy mikado locomotives.

Repairing. Repairing Locomotives in a Manufacturing Plant, H. Campbell. Am. Mach., vol. 61, no. 9, Aug. 28, 1924, pp. 329–332, 10 figs. Details of some of the tools and methods used in a section of plant of Minneapolis Steel & Machinery Co., Minneapolis, Minn.

Repairing Locomotives Under Contract. Boiler Maker, vol. 24, no. 8, Aug. 1924, pp. 221–225, 13 figs. Beech Grove shop operating system developed by Railway Service & Supply Corp. performs valuable service for Big Four.

Resistance of. Locomotive Resistance and Tractive Force, K. Asakura. Ry. Mech. Engr., vol. 98, no. 9, Sept. 1924, pp. 523–527, 9 figs. States that locomotive resistance should be partly represented as so many pounds per ton weight and partly as a function of mechanical efficiency. Formula for mechanical efficiency is developed and method of calculating tractive effort by applying mechanical efficiency explained. Results of calculation according to this method are nearly equal to those calculated by speed-factor method; can be applied to a locomotive whose boiler capacity is less than 100 per cent.

Stacks. Experimental Investigation of Locomotive Stacks (Experimentelle Untersuchung von Lokomotivschornsteinen), F. C. Huygen. Zeit. des Österr Ingenieur- u. Architekten-Vereines, vol. 76, no. 27/28, July 11, 1924, pp. 248–251, 3 figs. Discusses course of temperature, pressure, and velocity of flow from smokebox to mouth of stack. Translated from Dutch.

Steam-Turbine. Turbine Locomotives (Locomotives à turbines), M. Lamy. Revue Industrielle, vol. 54, no. 2181, Aug. 1924, pp. 217–221, 7 figs. Describes Escher Wyss type of Swiss Ry., Ljungström type in Sweden, and their design, construction and operation.

Superheater. Recent Steam Collecting Boxes for Superheater Locomotives (Neuere Dampfsammelkästen für Heissdampflokomotiven), M. Igel. Wärme, vol. 47, no. 26, June 27, 1924, pp. 306–307, 8 figs. Details of boxes of ingot iron in place of cast iron or steel to avoid welding; 70 boxes used by German railways as test.

Superheaters for. Locomotive Superheaters. Ry. Gaz., vol. 41, no. 7, Aug. 15, 1924, p. 224, 2 figs. Describes return bend evolved by Northeastern Mar. Eng. Co., Ltd., to meet most exacting conditions of service.

Switching. Oil-Electric Locomotive Built for Switching Service. Eng. News-Rec., vol. 93, no. 10, Sept. 4, 1924, pp. 390–391, 3 figs. Particulars of locomotive designed and built by Ingersoll-Rand Co. and Gen. Elec. Co. for N. Y. Central R. R. Co., for use in city streets; 300-hp. oil engine directly connected to a 200-kw. generator; four motors of a nominal rating of 95 hp. each, one of which is geared to each of four axles.

Oil-Engine Locomotive for Switching Service (Oelmotor-Lokomotiven für Rangierdienst). Schweizerische Bauzeitung, vol. 84, no. 7, Aug. 16, 1924, pp. 86–87, 7 figs. Details of design of 90-hp. 500-r.p.m. locomotive burning crude oil, developing 4000 kg. at drawbar.

Tank. New Goods Tank Locomotives, London Midland & Scottish Railway. Ry. Gaz., vol. 41, no. 7, Aug. 15, 1924, p. 215, 2 figs. Construction of inside-cylinder-type 0–6–0 engines for Lond., Midland & Scottish Ry.; cylinders; diameter, 18½ in.; piston stroke, 26 in.; wheelbase, 16 ft. 6 in.

Testing. Testing Locomotives on the Great Western Railway. Ry. Gaz., vol. 41, no. 7, Aug. 15, 1924, pp. 216–221, 8 figs. Abstract of paper read before First World Power Conference.

Tracking Qualities, Testing. Ortheograph Records Locomotive Characteristics, P. M. Gillilan. Ry. Age, vol. 77, no. 7, Aug. 16, 1924, pp. 283–286, 9 figs. Use of device properly calibrated gives accurate determination of tracking qualities of equipment.

LUBRICATING OILS

Classification. Practical Hints on Oils and Machinery Lubrication, W. E. Biggs and W. R. Woolrich. Nat. Engr., vol. 28, no. 9, Sept. 1924, pp. 129–131. Discusses qualities of good oil; some engine-room tests for oils; classification of oils; what oils to use for different services; grease and solid lubricants.

Friction of. Determination of Friction of Lubricating Oils (Zur Bestimmung der Schmiermittelreibung), R. Vieweg. Petroleum, vol. 20, no. 19, July 1, 1924, pp. 899–903, 6 figs. Discusses method which enables determination of friction losses in any bearings with any lubricant on basis of measurement of operating temperature and efficiency.

Purification. Conservation, Upkeep, and Purification of Lubricating Oils (Conservation, manutention et purification des huiles de graissage principes généraux et méthodes modernes), J. Lévy. Technique Moderne, vol. 16, no. 13, July 1, 1924, pp. 453–460, 14 figs. Discusses storage, purification of used oils, nature and origin of impurities, filters, centrifugal separation, etc.

Testing. Tests for Lubricating Oils. Power Plant Eng., vol. 28, no. 16, Aug. 15, 1924, pp. 853–854. Details of number of tests and their comparative value.

M

MACHINE SHOPS

Construction. Steel Machine-Shop Construction (Eiserne Werkstattbauten), H. Gruetz. Bauingenieur, vol. 5, no. 14, July 31, 1924, pp. 430–435, 12 figs. Discusses modern machine-shop construction, consideration of largely increased dimensions, roof construction, light conditions, and quotes various examples of internal arrangement.

Inefficient Machinery, Cost of. How Much Are Inefficient Machines Costing You? K. H. Condit. Am. Mach., vol. 61, no. 12, Sept. 18, 1924, pp. 451–452, 1 fig. Machine equipment sets production limits. Keeping track of cost of inefficient machines. Cost data show when to throw out obsolete equipment.

MACHINE TOOLS

Demand Forecast. Forecasting Demand for Industrial Equipment, E. F. DuBrul. Mech. Eng., vol. 46, no. 9, Sept. 1924, pp. 539–542, 5 figs. Business cycle in machine-tool industry. Coöperative study of stabilization. Machine-tool barometer.

Design. Methods of Machine Tool Design, A. L. De Leeuw. Am. Mach., vol. 61, no. 8, Aug. 21, 1924, pp. 317–320, 7 figs. Feeds of intermittent type.

Germany. Progress in the Technics of Working Metals, with Special Reference to the Leipzig Spring Fair (Fortschritte der Metallbearbeitungstechnik unter Berücksichtigung der Leipziger Frühjarsmesse), M. Buxbaum. Zeit. des Vereines deutscher Ingenieure, vol. 68, nos. 29 and 31, July 19 and Aug. 2, 1924, pp. 745–750 and 798–802, 27 figs. Reviews most important improvements in working metals, machine tools and tool industry, covering lathes, drilling and molding machines, planers, etc., grinding machines, circular and surface, grinding wheels, saws, files, hammers, etc.

Magazine Attachments. Design of Magazine Attachments, A. A. Dowd. Machy. (Lond.), vol. 24, no. 620, Aug. 14, 1924, pp. 617–620, 8 figs. Magazine attachments for irregular work.

Olympia Exhibition, Eng. British Machine Tools at the Olympia Exhibition. Engineer, vol. 138, no. 3585, Sept. 12, 1924, 16 pp. (Supp.), 47 figs. Descriptions of some of the British machine tools exhibited.

Small Tools for. Development of Tools Provides Simpler Ways for Performing Specific Operation W. L. Carver. Automotive Industries, vol. 51, no. 12, Sept. 18, 1924, pp. 524–525, 8 figs. Describes reamer having die-cast head and high-speed steel cutter blades, new line of adjustable shell reamers which makes use of five sizes of blade, and improved system of jig bushings.

Standardization. Contribution to the Question of Standardization of Machine Tools (Beitrag zur Frage der Vereinheitlichung im Werkzeugmaschinenbau), E. Toussaint. Praktische Maschinen-Konstrukteur, vol. 57, no. 22, June 17, 1924, pp. 306–309. Discusses principal point regarding lathes and shows that even in far-reaching standardization peculiarity of construction by individual firms may be maintained.

Standardization Versus Individuality, L. D. Burlingame. Mech. Eng., vol. 46, no. 9, Sept. 1924, pp. 529–530 and 538. Discusses standardization in machine-tool industry, giving a word of caution against the too eager adoption of ill-advised standards.

MACHINING METHODS

Automobile Brake Parts. Machining Parts for Four-Wheel Brakes, H. Compbell. Am. Mach., vol. 91, no. 12, Sept. 18, 1924, pp. 465–467, 9 figs. Details of machining operations on cylinders and pistons for hydraulic brakes in Timkin-Detroit axle plant.

Automobile Cylinder Blocks. Machining Buick Cylinder Blocks, J. Younger. Am. Mach., vol. 1, no. 13, Sept. 25, 1924, pp. 503–505, 10 figs. Methods used in shops of Buick Motor Car Co.

Locomotive Cylinders. New York Central Cylinders, L. C. Morrow. Am. Mach., vol. 61, no. 13, Sept. 25, 1924, pp. 493–494, 4 figs. Operation sequence and methods at West Albany shops of New York Central valuable for comparative purposes.

MALLEABLE CASTINGS

Europe. A European View of the Malleable Question, T. Levoz. Foundry Trade Jl., vol. 30, no. 419, Aug. 28, 1924, pp. 175–177. Discusses what is suitable metal, selection of furnace, electric-furnace experiments, methods of producing malleable iron, etc.

MARINE STEAM TURBINES

Blade Material. Steam and Compressed-Air Trials with Turbine-Blade Material (Dampf- und Druckluftblasversuche mit Turbinenschaufelmaterial), B. Schulz. Brennstoff- u. Wärmewirtschaft, vol. 6, no. 6, June 1924, pp. 138–140, 2 figs. Discusses tests carried out by German Navy in devising acceptance test for blade material; 25 per cent Ni steel gave best results.

MATERIALS

Overstrain and Strength. A New Theory on Overstrain and Strength of Materials, H. P. Troendly and G. V. Pickwell. Am. Soc. for Steel Treating—Trans., vol. 6, no. 2, Aug. 1924, pp. 145–170, 7 figs. Discusses new theory on mechanics of overstrain and strength, i.e., plastic transfer of proportional elastic range; increase in strength in any direction is at expense of strength in opposite direction; increase in strength in direction of overstrain is through mechanism of slip, etc.

MATERIALS HANDLING

Ford Motor Co. Plant. Mechanical Handling at River Rouge, M. W. Potts. Indus. Mgt. (N. Y.), vol. 68, no. 2, Aug. 1924, pp. 67–114, 103 figs. Describes receiving and distributing raw materials, blast furnace as a materials-handling problem, world's most modern foundry, handling large castings through production operations in machine shop, power-house fuel handling and electric-furnace building, sawmill and the tractor assembly, successful innovations in plate-glass manufacture, mechanical handling in by-products plant, and miscellaneous industries within Ford plant.

MEASUREMENTS

Machine-Shop. Shop Measurements, E. Buckingham. Mech. Eng., vol. 46, no. 9, Sept. 1924, pp. 535–538. English and metric standards of length and their interrelation. Accuracy and purposes of shop measurements.

METALLOGRAPHY

Applications. Practical Metallography, S. P. Rockwell. Am. Mach., vol. 61, no. 13, Sept. 25, 1924, pp. 487–492, 18 figs. Applications of metallography to solution of problems in average plant. Practical methods of procedure. Illustrated studies

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Alphabetical List on page 154

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Bethlehem Shipbldg.Corp'n(Ltd.)
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* Vilter Mfg. Co.

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Alteneder, Theo. & Sons
American Lead Pencil Co.
Dietzgen, Eugene Co.
* Dixon, Joseph Crucible Co.
Keuffel & Esser Co.
New York Blue Print Paper Co.
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Smith, S. Morgan Co.

Pile Drivers
Clyde Iron Works Sales Co.
Lidgerwood Mfg. Co.

Pinions, Rolling Mill
* Foote Bros. Gear & Machine Co.
Mackintosh-Hemphill Co.

Pinions, Steel
* Foote Bros. Gear & Machine Co.
* General Electric Co.

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* Wheeler Condenser & Engrg. Co.

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* Builders Iron Foundry
* Central Foundry Co.
* U. S. Cast Iron Pipe & Fdry. Co.

Pipe, Forge Welded
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Pipe, Riveted
* American Spiral Pipe Wks.
* Springfield Boiler Co.
Steere Engineering Co.
* Titusville Iron Works Co.
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* Central Foundry Co.

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* American Spiral Pipe Wks.

Pipe, Steel
* Crane Co.
Steere Engineering Co.

Pipe, Welded
* American Spiral Pipe Wks.
* Crane Co.
* Pittsburgh Valve, Fdry. & Const. Co.
Steere Engineering Co.

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Byers, A. M. Company
* Crane Co.

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(See Coils, Covering, Fittings, etc., Pipe)

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* Crane Co.
* Landis Machine Co. (Inc.)

Piping, Ammonia
* Frick Co. (Inc.)

Piping, Power
* Crane Co.
* Pittsburgh Valve, Fdry. & Const. Co.
Steere Engineering Co.
* Vogt, Henry Machine Co.

Pitot Tubes
(See Tubes, Pitot)

Planimeters
Alteneder, Theo. & Sons
* American Schaeffer & Budenberg Corp'n
* Bristol Co.
* Crosby Steam Gage & Valve Co.
Dietzgen Eugene Co.
Keuffel & Esser Co.
New York Blue Print Paper Co.
U. S. Blue Co.
Weber, F. Co. (Inc.)

Plate Metal Work
(See Steel Plate Construction)

Pointers, Bolt
* Landis Machine Co. (Inc.)

Polishing Machinery
* Builders Iron Foundry
* Royersford Fdry. & Machine Co.

Powdered Fuel Equipment (for Boiler and Metallurgical Furnaces)
* Allis-Chalmers Mfg. Co.
* Combustion Engineering Corp'n
* Grindle Fuel Equipment Co.
* Quigley Furnace Specialties Co.
* Smidth, F. L. & Co.
* Worthington Pump & Machinery Corp'n

Power Transmission Machinery
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* Chain Belt Co.
* Diamond Chain & Mfg. Co.
* Falls Clutch & Machinery Co.
* Farrel Foundry & Machine Co.
* Foote Bros. Gear & Machine Co.
* Franklin Machine Co.
* General Electric Co.
Hill Clutch Machine & Fdry. Co.
* Hyatt Roller Bearing Co.
* Jones, W. A. Fdry. & Mach. Co.
Link-Belt Co.
* Medart Co.
* Morse Chain Co.
* Palmer-Bee Co.
* Royersford Fdry. & Mach. Co.
* Smidth, F. L. & Co.
Smith, S. Morgan Co.
Wood's, T. B. Sons Co.

Preheaters, Air
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Prat-Daniel Corporation

Presses, Baling
* Franklin Machine Co.

Presses, Draw
Niagara Machine & Tool Works

Presses, Extruding
* Farrel Foundry & Machine Co.

Presses, Foot
Niagara Machine & Tool Wks.
* Royersford Fdry. & Mach. Co.

Presses, Forming
* Farrel Foundry & Machine Co.
Niagara Machine & Tool Wks.

Presses, Hydraulic
* Falls Clutch & Machinery Co.
* Farrel Foundry & Machine Co.
Mackintosh-Hemphill Co.

Presses, Power
Niagara Machine & Tool Wks.

Presses, Punching and Trimming
* Long & Allstatter Co.
Niagara Machine & Tool Works
* Royersford Fdry. & Mach. Co.

Presses, Sheet Metal Working
Niagara Machine & Tool Works

Presses, Toggle
Niagara Machine & Tool Works

Presses, Wax
* Vogt, Henry Machine Co.

Pressure Gages, Regulators, etc.
(See Gages, Regulators, etc., Pressure)

Producers, Gas
* De La Vergne Machine Co.
* Westinghouse Electric & Mfg. Co.
* Worthington Pump & Mchry. Corp'n

Projectors, Flood Lighting
* Westinghouse Elect. & Mfg. Co.

Propellers
* Morris Machine Works

Pulleys, Friction Clutch
* Allis-Chalmers Mfg. Co.
* Brown, A. & F. Co.
* Falls Clutch & Machinery Co.
Hill Clutch Machine & Fdry. Co.
Johnson, Carlyle Machine Co.
* Jones, W. A. Fdry. & Mach. Co.
Link-Belt Co.
* Medart Co.
Wood's, T. B. Sons Co.

Pulleys, Iron
* Brown, A. & F. Co.
* Chain Belt Co.
* Falls Clutch & Machinery Co.
* Gifford-Wood Co.
Hill Clutch Machine & Fdry. Co.
* Jones, W. A. Fdry. & Mach. Co.
Link-Belt Co.
* Medart Co.
Wood's, T. B. Sons Co.

Pulleys, Steel
* Medart Co.

Pulleys, Wood
* Medart Co.

Pulverizers
* Brown, A. & F. Co.
* Combustion Engineering Corp'n
* Smidth, F. L. & Co.

Pulverizers, Cement Materials
Pennsylvania Crusher Co.

Pulverizers, Coal
* Combustion Engineering Corp'n
* Furnace Engineering Co.
* Grindle Fuel Equipment Co.
Pennsylvania Crusher Co.

Pulverizers, Limestone
Pennsylvania Crusher Co.

Pump, Governors, Valves, etc.
(See Governors, Valves, etc., Pump)

Pumping Engines
(See Engines, Pumping)

Pumping Systems, Air Lift
* Ingersoll-Rand Co.

Pumps, Acid
Buffalo Steam Pump Co.
* Ingersoll-Rand Co.
* Nordberg Mfg. Co.
Taber Pump Co.
* Titusville Iron Works Co.

Pumps, Air
* Goulds Mfg. Co.
* Ingersoll-Rand Co.
* Westinghouse Electric & Mfg. Co.
* Wheeler, C. H. Mfg. Co.

Pumps, Ammonia
Buffalo Steam Pump Co.
* Goulds Mfg. Co.
* Ingersoll-Rand Co.
* Vogt, Henry Machine Co.
* Worthington Pump & Machinery Corp'n

Pumps, Boiler Feed
* Allis-Chalmers Mfg. Co.
Bethlehem Shipbldg.Corp'n(Ltd.)
Buffalo Steam Pump Co.
* Coppus Engineering Corp'n
* De Laval Steam Turbine Co.
* Goulds Mfg. Co.
* Ingersoll-Rand Co.
Kerr Turbine Co.
* Wheeler, C. H. Mfg. Co.
* Worthington Pump & Machinery Corp'n

Pumps, Centrifugal
* Allis-Chalmers Mfg. Co.
Bethlehem Shipbldg.Corp'n(Ltd.)
Buffalo Steam Pump Co.
* Cramp, Wm. & Sons Ship & Engine Bldg. Co.
* DeLaval Steam Turbine Co.
* Goulds Mfg. Co.
* Ingersoll-Rand Co.
Kerr Turbine Co.
Lammert & Mann Co.
* Morris Machine Works
* Nordberg Mfg. Co.
Taber Pump Co.
* Westinghouse Electric & Mfg. Co.
* Wheeler, C. H. Mfg. Co.
* Wheeler Cond. & Engrg. Co.
* Worthington Pump & Machinery Corp'n

Pumps, Condensation
Buffalo Steam Pump Co.
* Ingersoll-Rand Co.
* Wheeler, C. H. Mfg. Co.

Pumps, Deep Well
* Allis-Chalmers Mfg. Co.
* Goulds Mfg. Co.
* Ingersoll-Rand Co.
* Morris Machine Works
* Worthington Pump & Machinery Corp'n

Pumps, Dredging
* Ingersoll-Rand Co.
* Morris Machine Works
* Worthington Pump & Machinery Corp'n

Pumps, Electric
* Allis-Chalmers Mfg. Co.
Buffalo Steam Pump Co.
* Goulds Mfg. Co.
* Ingersoll-Rand Co.
* Morris Machine Works
* Nordberg Mfg. Co.
Taber Pump Co.
* Worthington Pump & Machinery Corp'n

Pumps, Elevator
Buffalo Steam Pump Co.
* Goulds Mfg. Co.
* Worthington Pump & Machinery Corp'n

Pumps, Filter Press
Buffalo Steam Pump Co.
* Goulds Mfg. Co.

Pumps, Hand
* Goulds Mfg. Co.
Taber Pump Co.

Pumps, Hydraulic
* American Fluid Motors Co.
* Farrel Foundry & Machine Co.

Pumps, Hydraulic Pressure
Bethlehem Shipbldg.Corp'n(Ltd.)
Buffalo Steam Pump Co.
* Goulds Mfg. Co.
* Ingersoll-Rand Co.
* Morris Machine Works
* Worthington Pump & Machinery Corp'n

Pumps, Measuring
Wayne Tank & Pump Co.

Pumps, Measuring (Gasoline or Oil)
* Bowser, S. F. & Co. (Inc.)

Pumps, Oil
Bethlehem Shipbldg.Corp'n(Ltd.)
* Bowser, S. F. & Co. (Inc.)
Buffalo Steam Pump Co.
* Goulds Mfg. Co.
* Ingersoll-Rand Co.
Lunkenheimer Co.
Taber Pump Co.
* Worthington Pump & Machinery Corp'n

Pumps, Oil, Force-Feed
Bethlehem Shipbldg.Corp'n(Ltd.)
* Bowser, S. F. & Co. (Inc.)
* Goulds Mfg. Co.
Lunkenheimer Co.

Pumps, Oil (Hand)
* Bowser, S. F. & Co. (Inc.)
* Goulds Mfg. Co.
Lunkenheimer Co.

Pumps, Power
* Allis-Chalmers Mfg. Co.
Bethlehem Shipbldg.Corp'n(Ltd.)
Buffalo Steam Pump Co.
* Goulds Mfg. Co.
* Ingersoll-Rand Co.
* Nordberg Mfg. Co.
* Wheeler Cond. & Engrg. Co.
* Worthington Pump & Machinery Corp'n

Pumps, Rotary
* Goulds Mfg. Co.
Lammert & Mann Co
Taber Pump Co.

Pumps, Steam
* Allis-Chalmers Mfg. Co.
Buffalo Steam Pump Co.
* Ingersoll-Rand Co.
* Nordberg Mfg. Co.
* Wheeler, C. H. Mfg. Co.
* Wheeler Cond. & Engrg. Co.
* Worthington Pump & Machinery Corp'n

Pumps, Sugar House
* Allis-Chalmers Mfg. Co.
Buffalo Steam Pump Co.
* Goulds Mfg. Co.
* Ingersoll-Rand Co.
* Worthington Pump & Machinery Corp'n

Pumps, Sump
Buffalo Steam Pump Co.
* Goulds Mfg. Co.
* Ingersoll-Rand Co.
* Morris Machine Works
* Smidth, F. L. & Co.
Taber Pump Co.

Pumps, Tank
Buffalo Steam Pump Co.
* Goulds Mfg. Co.
* Ingersoll-Rand Co.
Taber Pump Co.
* Wheeler, C. H. Mfg. Co.
* Wheeler Cond. & Engrg. Co.
* Worthington Pump & Machinery Corp'n

Pumps, Turbine
* Allis-Chalmers Mfg. Co.
Buffalo Steam Pump Co.
* De Laval Steam Turbine Co.
* General Electric Co.
* Goulds Mfg. Co.
* Ingersoll-Rand Co.
Kerr Turbine Co.
* Morris Machine Works
* Westinghouse Electric & Mfg. Co.
* Worthington Pump & Machinery Corp'n

Pumps, Vacuum
Buffalo Steam Pump Co.
* Croll-Reynolds Engrg. Co. (Inc.)
* Goulds Mfg. Co.
* Ingersoll-Rand Co.
Lammert & Mann Co.
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* Worthington Pump & Machinery Corp'n

Punches, Multiple
* Long & Allstatter Co.
Mackintosh-Hemphill Co.

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Purifiers, Oil
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METAL SPRAYING

Capabilities and Applications. Metal Spraying and Sprayed Metal, T. H. Turner and W. E. Ballard. Inst. of Metals, Advance Paper no. 14, for Mtg. Sept. 8–11, 1924, 17 pp., 25 figs. on supp. plates. Indicates critically actual capabilities of metal spraying as now practiced in England and other countries. Investigation includes examination of history of process and of its present capabilities and applications. Bibliography.

METALS

Attack by Acids. How are Metals Attacked by Acids? (Wie werden Metalle von Säuren angegriffen?) R. Gans. Zeit. für Physikalische Chemie, vol. 109, no. 1–2, Apr. 12, 1924, pp. 49–64, 7 figs. Results of experiments with An-Ag and HNO_3, and Ag and H_2S to determine time and manner of attack.

Elasticity of, Measurement. Further Contribution to Dynamic Measurement of Elasticity in Metals and Alloys (Weiterer Beitrag zur dynamischen Elastizitätsmessung an Metallen und Legierungen), G. Welter. Zeit. für Metallkunde, vol. 16, no. 6, June 1924, pp. 213–220, 24 figs. Describes new testing method for determining impact-elongation elasticity; effect of falling weight on dynamic limit of elasticity; compares dynamic and static elongation test.

Macrography. New Process of Metal Macrography by Direct Impression on Films (Nouveau procédé de macrographie des métaux par impression directs sur pellicule), J. Durand. Génie Civil, vol. 85, no. 6, Aug. 9, 1924, pp. 131–133, 6 figs. Discusses direct examination of metals more or less polished and etched with reagent as part of acceptance test, giving details especially of segregations, deformations due to working, solidification, and effect of any factor modifying the structure.

Microstructure. Anomalies in Metals Disclosed by the Metallographic Microscope (Le anamalie dei metalli rilevate dal microscopio metallografico), V. Prever. Ingegneria, vol. 3, nos. 6 and 8, June 1 and Aug. 1, 1924, pp. 196–200 and 273–278, 38 figs. Discusses size of grain, annealing and cooling, and effect on microstructure and properties; heterogeneous inclusions, cavities, impurities, abnormal thermal conditions, etc.

Plastic Deformation. The Effect of Free Surfaces on the Plastic Deformation of Certain Metals, F. C. Thompson and W. E. W. Millington. Iron & Steel Inst., Advance Paper no. 9, for Mtg. Sept. 1924, 14 pp., 3 figs. partly on supp. plate. Gives reasons for believing that at free surfaces deformation will differ distinctly from that within mass; and shows importance of this in connection with determination of elastic limit and with elastic failure.

Protective Coating of. New Metal Coatings (Neuere Metallüberzüge). Zeit. für Metallkunde, vol. 16, no. 5, May 1924, pp. 175–179. Discusses Liebreich process of electrolytic coating with chromium to prevent corrosion, and Schulze electrolytic coating process of aluminum for protection against weather conditions or chemicals.

Tensile Strength. The Relationship between Tensile Strength, Temperature, and Cold-Work in Some Pure Metals and Single Solid Solutions, D. H. Ingall. Inst. of Metals, Advance Paper no. 8, for Mtg. Sept. 8–11, 1924, 24 pp., 7 figs. Results of investigation on silver, aluminum, nickel, 70:30 brass, and 80:20 cupro-nickel.

Testing. Importance of Elastic Limit, Elongation and Notched-Bar Test for Constructors (Ueber die Bedeutung der Elastizitätsgrenze, Bruchdehnung und Kerbzähigkeit für den Konstrukteur), P. Ludwik. Zeit. für Metallkunde, vol. 16, no. 6, June 1924, pp. 207–212. Discuses value of usual tensile-strength testing methods, emphasizes insufficiency of tensile test, uncertainty of measuring limit of elasticity, and suitability of combining tensile strength with notched-bar test.

New Forms of Test Bars for Tensile Strength Test and Holding Devices (Neue Zugprobestabformen und Einspannvorrichtungen), F. Rinagl. Maschinenebau, vol. 3, no. 21, Aug. 14, 1924, pp. 770–773, 4 figs. Discusses defects of present production of test bars and holding devices and describes improvements for short bars, new bar forms for brittle and elastic material, comparative cost of production.

MILLING CUTTERS

Cooling. Cooling Cutters in Milling (Die Kühlung der werkzeuge beim Fräsen), M. von Brandt. Werkstattstechnik, vol. 18, no. 15, Aug. 1, 1924, pp. 393–394, 3 figs. Discusses inadequate provisions for supplying cooling water to high-speed milling cutters; gives suggestions for effective cooling and states satisfactory results obtained.

Cutting Ratio. Cutting Ratios of Cutter Heads in Milling Aluminum Alloys (Die Ermittlung der günstigsten Schnittverhältnisse von Messerköpfen beim Fräsen von Aluminiumlegierungen), W. Lippart. Maschinenbau, vol. 3, no. 18, June 26, 1924, pp. 657–659, 5 figs. Discusses most favorable and economic angle of cutters, feeds, power consumption, etc.

MILLING MACHINES

Feed Drive. Choice of Feed Drive in Milling Machines (Wahl des Vorschubantriebes bei Fräsmaschinen), E. Toussaint. Praktische Maschinen-Konstrukteur, vol. 57, no. 23, June 24, 1924, pp. 327–331, 14 figs. Shows by three different examples that independent drive of feed table is best solution, and that drive from cutter shaft must be eliminated.

High-Production Milling. How Milling Machine Service Has Helped Manufacturers, F. H. Colvin. Am. Mach., vol. 61, no. 11, Sept. 11, 1924, pp. 405–409, 12 figs. Shows how high-production milling can be secured on standard machines by use of well-designed fixtures.

Specialized Work. Wide Range of Specialized Work Now Performed by Milling Machines, W. L. Carver. Automotive Industries, vol. 51, no. 8, Aug. 21, 1924, pp. 356–360, 10 figs. Standard machines with special heads do great variety of work at small additional expense, and place this type of tool in semi-automatic class.

MOLDING MACHINES

Sandslinger. Recent Developments in Moulding Practice. Eng. Production, vol. 7, no. 143, Aug. 1924, p. 263, 2 figs. Details of design and construction of sandslinger machines.

Types. Moulding Machines, J. McClelland. pp. 57–60 (includes discussion), 7 figs. Describes hand-operated, power, and jolt-ramming machines, and a boxless machine.

MOLDING METHODS

Condensers. A Method of Moulding a Condenser. Foundry Trade Jl., vol. 30, no. 415, July 31, 1924, pp. 101–102, 4 figs. Practical details of molding and core making for making of a condenser. Main dimensions of casting are: Depth, with top and bottom flanges, approximately 8 ft.; diameter, 10 ft.; inside diameter of body, 9 ft.; thickness of metal, 1½ in.

MOLDS

Production by Templets. Production of Molds by Means of Templets (Die Herstellung von Giessformen mittels Schablonen), R. Löwer. Zeit. des Österr. Ingenieur- u. Architekten-Vereines, vol. 76, no. 27/28, July 11, 1924, pp. 251–253, 11 figs. Gives various examples of application of templets in making molds.

MOTOR BUSES

Design. European Motor Bus Design. Elec. Ry. Jl., vol. 64, no. 12, Sept. 20, 1924, pp. 448–452, 13 figs. Double-deck design coming in use more and more; effort being made to inclose upper deck for all weather; light wood bodies used; weight limitation imposed by Dept. of Police.

Interurban Service. Co-Ordinating Interurban Service. Elec. Ry. Jl., vol. 64, no. 11, Sept. 13, 1924, pp. 379–382, 4 figs. Bus lines operated by Pennsylvania-Ohio Elec. Co. parallel its interurban railway lines; operation successful as means of providing de luxe service; maintenance of coaches performed in company's garage.

Railway-Operated. North Shore Line Eliminates Bus Competition. Ry. Age, vol. 77, no. 7, Aug. 16, 1924, pp. 275–277, 5 figs. Chicago, North Shore & Milwaukee operates its own fleet of highway coaches tributary to main line.

Types. Discussion of Papers at the 1924 Annual Meeting. Soc. Automotive Engrs.—Jl., vol. 15, no. 2, Aug. 1924, pp. 163–174, 4 figs. Discussions of papers on Field and Future of Motorbus, J. A. Emery, Double-Deck Motor Omnibus, R. W. Meade and Essentials of Successful Constant-Compression Engine, C. E. Sargent.

MOTOR TRUCKS

Brakes. Through Air Brakes for Motor Truck Trains (Durchgehende Luftdruckbremse für Autozüge). Technische Blätter, vol. 14, no. 30, July 26, 1924, pp. 225–226, 3 figs. Details of design and operation of Knorr brake, applicable to each truck and functioning similar to air brakes used on railroad trains.

Lighting. Self-Contained Magneto Generator Designed for Truck and Tractor Lighting. Automotive Industries, vol. 51, no. 12, Sept. 18, 1924, pp. 529–530, 3 figs. Describes electric generator brought out by Harris Elec. Co. of San Francisco, Cal. Less than 0.5 volt and less than 0.3 ampere shown as a difference in output at engine speeds from 800 to 3000 r.p.m. Lubrication is effected from the oiling system of the engine.

Manufacture. Complete Gaging System Fosters Pride in Maintaining High Quality, W. L. Carver. Automotive Industries, vol. 51, no. 11, Sept. 11, 1924. pp. 472–476, 9 figs. Every individual in shop is convinced of benefits derived from accuracy in work made possible by exceptional tools for checking all parts manufactured in plant of the General Motors Truck Co.

Q.M.C., U.S.A. New Q.M.C. Trucks Drive on Four or Six Wheels, H. Chase. Automotive Industries, vol. 51, no. 6, Aug. 7, 1924, pp. 271–275, 11 figs. Rear-axle brakes run in oil and have lining attached to drum. Winch, driven off secondary gear set, is located entirely below frame. Units employed include Andrade self-locking differential, Covert gear set, and Hinkley engine. Universal helps in steering.

Six-Wheel. A Six-Wheel Truck with Four-Wheel Drive. West. Machy. Wld., vol. 15, no. 7, July 1924, pp. 229–230 and 246, 5 figs. Describes truck designed by A. H. Lacey and C. M. Crosson; driving unit contains two spiral bevel-gear assemblies, each rigidly attached to helical-gear assembly, thus making one compact unit which is attached to main-frame crossmembers; chassis designed to cover city and interurban buses, long-distance trucking, refrigerator trucks, and all high-speed transportation.

Thornycroft. A Moderate Cost 25–30-cwt. Chassis. Motor Transport (Lond.), vol. 39, no. 1018, Sept. 1, 1924, pp. 271–273, 9 figs. Details of new chassis having four cylinders combined in single casting with detachable head, and bore and stroke of 95 mm. and 127 mm., respectively.

Wheels. Laboratory Strength-Tests of Motor-Truck Wheels, T. W. Greene. Soc. Automotive Engrs.—Jl., vol. 15, no. 2, Aug. 1924, pp. 150–155 and 174, 13 figs. Discusses tests of mechanical properties of six types of wheels as shown in radial compression test, skid test, elastic resiliency, also character of failures, load deflection curves for skid test, etc.

O

OIL ENGINES

Heavy-Oil. Evolution of the Heavy-Oil Engine (L'évolution des moteurs a huiles lourdes), R.-E. Mathot. Société des Ingénieurs Civils de France—Mémoires et Compte Rendu des Travaux, vol. 77, no. 1–2–3, Jan.-Mar. 1924, pp. 143–181, 20 figs. Discusses properties of fuel oils, Diesel-type engines, explosion engines, and their design and construction.

Power-Plant. Types of Modern Power Plant Oil Engines. Oil Engine Power, vol. 2, no. 8, Aug. 1924, pp. 419–422, 6 figs. Savings due to elimination of air compressor and of geared camshaft drive have been applied to improvements in general features of design; chain which is used in place of timing gears has big factor of safety against wear.

Water-Works. Oil Engines for New York City's Water Supply. Oil Engine Power, vol. 2, no. 8, Aug. 1924, pp. 426–427, 2 figs. Specifications which are being prepared for replacement of steam-driven pumps at Clove Station, Staten Island.

OIL FUEL

Burners. Oil Firing for Steam-Boiler and Central Heating Plants (Oelfeuerung bei Dampfkesseln und Zentralheizungen), M. Hottinger. Schweizerische Bauzeitung, vol. 83, nos. 25, 26; vol. 84, nos. 4 and 5, June 21, 28, July 26 and Aug. 2, 1924, pp. 292–295, 305–307, 44–48 and 58–62, 41 figs. Describes burners of various types used in industrial plants and locomotives; steam boiler plants with oil firing; oil firing for central heating boilers; kinds of oils and their properties, operating costs of heating by means of oil and of coke.

Burning. How They Heat with Fuel Oil on the Pacific Coast, C. W. Wright. Heat & Vent. Mag., vol. 21, no. 8, Aug. 1924, pp. 41–43 and 45, 4 figs. Notes on present practice in section of country where oil burning has long been successfully applied.

Ignition Point of. The Ignition-Point of Fuel Oils Under Pressure, J. Tauss and F. Schulte. Mar. Engr. & Motorship Bldr., vol. 47, no. 564, Sept. 1924, pp. 325–328, 10 figs. Account of recent important experimental work. Translated from Zeit. des Vereines deutscher Ingenieure, May 31, 1924.

OXY-ACETYLENE CUTTING

Cast Iron. Cutting Cast Iron, J. Fitzgibbons. Welding Engr., vol. 9, no. 8, Aug. 1924, pp. 23–24, 2 figs. Chemical discussion of cutting cast iron by oxy-acetylene; elements found in cast iron and their affinity for oxygen.

OXY-ACETYLENE WELDING

Efficiency. Present State of Autogenous Welding and Cutting of Metals (L'état actuel de la soudure autogène et du découpage des métaux), M. R. Thomas. Société des Ingénieur Civils de France—Mémoires et Compte Rendu des Travaux, vol. 77, no. 1–2–3, Jan.-Mar. 1924, pp. 182–201, 6 figs. Discusses methods of assembling and welding, welding rods, cutting, equipment, etc.

Practice. Oxy-Acetylene Welding. Welding Engr., vol. 9, no. 8, Aug. 1924, pp. 34–40. Discusses torch manipulation; training welders; selection of welding rods and test of rods.

P

PAINTS

Heat-Absorption-Reducing. Paints of High Luminosity to Reduce Refrigeration Losses, H. A. Gardner and H. C. Parks. Paint Mfr.'s Assn. of U. S., Sci. Sec., circular no. 213, Sept. 1924, pp. 82–84, 2 figs. Suggests use of white or light tints for refrigerating cars or ships to reduce heat absorption.

Insulation Value. Insulation Value of Paint and Its Effect in Reducing Condensation, H. A. Gardner. Paint Mfr.'s Assn. of U. S., Sci. Sec., circular no. 212, Sept. 1924, pp. 80–81, 1 fig. Shows insulating power by metal pipes carrying cold water in warm room, painted parts of which show no condensation.

Thickening. Thickening of Paints (L'épaississement des peintures), C. Coffignier. Chimie & Industrie, vol. 11, no. 6, June 1924, pp. 1083–1085. Discusses phenomenon of thickening; thickening with polymerized and crude oils; how to avoid it.

PAPER MACHINERY

Combined Beating and Refining Engine. Beating and Refining Engine. Paper, vol. 34, no. 20, Sept. 4, 1924, pp. 899–900, 2 figs. Describes combined beating and refining engine invented by Sheldon Leicester, designed to produce a continuous flow of stock, beaten as to length, hydration and flexibility (1) by regulating speed of motor, (2) by set of bedplates and (3) by dilution of stock.

Grinders. A Permanent Grinder for the Production of Wood Pulp for the Manufacture of Paper. Eng. Progress, vol. 5, no. 8, Aug. 1924, pp. 157–159, 6 figs. Describes method and practical design of grinder and results achieved in practice; grinding stone may be driven either electrically, hydraulically or by some other power.

PAPER MILLS

Electric Drive. Details of Paper-Mill Drives and Power Service, H. E. Stafford. Indus. Engr., vol. 82, no. 8, Aug. 1924, pp. 360–367 and 400–401, 11 figs. Includes transformation and distribution of electric power throughout mill, together with types of motors

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* Tagliabue, C. J. Mfg. Co.

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Regulators, Automatic Arc-Furnace
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Regulators, Blower
Foster Engineering Co.
* Mason Regulator Co.

Regulators, Condensation
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Regulators, Damper
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* Fulton Co.
Kieley & Mueller (Inc.)
* Mason Regulator Co.

Regulators, Electric
* General Electric Co.
* Westinghouse Electric & Mfg. Co.

Regulators, Fan Engine
Foster Engineering Co.

Regulators, Feed Water
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Elliott Co.
Kieley & Mueller (Inc)
Squires, C. E. Co.

Regulators, Flow (Steam)
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Regulators, Humidity
* Fulton Co.
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* Mason Regulator Co.

Regulators, Liquid Level
* Tagliabue, C. J. Mfg. Co.

Regulators, Pressure
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Foster Engineering Co.
* Fulton Co.
* General Electric Co.
Kieley & Mueller (Inc.)
* Mason Regulator Co.
* Tagliabue, C. J. Mfg. Co.

Regulators, Pump
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* Fulton Co.
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* Sarco Co. (Inc.)
* Tagliabue, C. J. Mfg. Co.

Regulators, Time
* Tagliabue, C. J. Mfg. Co.

Regulators, Vacuum
Foster Engineering Co.

Resistance Material (Electrical)
Driver-Harris Co.

Revolution Counters
(See Counters, Revolution)

Rings, Weldless
* Cann & Saul Steel Co.

Rivet Heaters, Electric
* General Electric Co.

Riveters, Hydraulic
Mackintosh-Hemphill Co.

Riveters, Pneumatic
* Ingersoll-Rand Co.

Riveting Machines
* Long & Allstatter Co.

Roller Bearings
(See Bearings, Roller)

Rolling Mill Machinery
* Farrell Foundry & Machine Co.
Mackintosh-Hemphill Co.

Rolls, Bending
Niagara Machine & Tool Works

Rolls, Crushing
* Farrel Foundry & Machine Co.
Link-Belt Co.
* Worthington Pump & Machinery Corp'n

Rolls, Forming (Sheet Metal)
Niagara Machine & Tool Wks.

Rolls, Rubber
* Goodrich, B. F. Rubber Co.
* United States Rubber Co.

Rolls, Steel
Mackintosh-Hemphill Co.

Roofing
Johns-Manville (Inc.)

Roofing, Asbestos
Johns-Manville (Inc.)

Rope, Hoisting
Clyde Iron Works Sales Co.
* Roebling's, John A. Sons Co.

Rope, Transmission
Hill Clutch Machine & Fdry. Co.
Link-Belt Co.
* Roebling's, John A. Sons Co.

Rope, Wire
Clyde, Iron Works Sales Co.
Hill Clutch Machine & Fdry. Co.
* Roebling's, John A. Sons Co.

Rope Drives
* Allis-Chalmers Mfg. Co.
* Brown, A. & F. Co.
* Falls Clutch & Machinery Co.
Hill Clutch Machine & Fdry. Co.
Link-Belt Co.
* Medart Co.
Wood's, T. B. Sons Co.

Rubber Goods, Mechanical
* Goodrich, B. F. Rubber Co.
* Jenkins Bros.
* United States Rubber Co.

Rubber Mill Machinery
* Farrel Foundry & Machine Co.

Sand Blast Apparatus
* De La Vergne Machine Co.

Saw Mill Machinery
* Allis-Chalmers Mfg. Co.

Saw Mills, Portable
* Frick Co. (Inc.)

Scales, Fluid Pressure
* Crosby Steam Gage & Valve Co.

Screens, Perforated Metal
* Hendrick Mfg. Co.

Screens, Revolving
* Allis-Chalmers Mfg. Co.
* Chain Belt Co.
* Gifford-Wood Co.
* Hendrick Mfg. Co.
Link-Belt Co.
* Smidth, F. L. & Co.

Screens, Shaking
* Allis-Chalmers Mfg. Co.
* Chain Belt Co.
* Gifford-Wood Co.
* Hendrick Mfg. Co.
Link-Belt Co.

Screens, Water Intake (Traveling)
* Chain Belt Co.
Link-Belt Co.

Screw Cutting Dies
(See Dies, Thread Cutting)

Screw Machines, Hand
* Jones & Lamson Mach. Co.
* Warner & Swasey Co.

Screws, Cap
* Scovill Mfg. Co.

Screws, Safety Set
Allen Mfg. Co.
* Bristol Co.

Screws, Set
Allen Mfg. Co.

Separators, Ammonia
* De La Vergne Machine Co.
Elliott Co.
* Frick Co. (Inc.)
* Vogt, Henry Machine Co.

Separators, Oil
Bethlehem Shipbldg.Corp'n(Ltd.)
* Cochrane Corp'n
* Crane Co.
* De La Vergne Machine Co.
Elliott Co.
Hoppes Mfg. Co.
Kieley & Mueller (Inc.)
* Vogt, Henry Machine Co.

Separators, Steam
* Cochrane Corp'n
* Crane Co.
Elliott Co.
Hoppes Mfg. Co.
Kieley & Mueller (Inc.)
* Pittsburgh Valve, Fdry. & Const. Co.
* Vogt, Henry Machine Co.

Shafting
* Allis-Chalmers Mfg. Co.
* Brown, A. & F. Co.
Cumberland Steel Co.
* Falls Clutch & Machinery Co.
Hill Clutch Machine & Foundry Co.
* Medart Co.
Union Drawn Steel Co.
Wood's, T. B. Sons Co.

Shafting, Cold Drawn
Hill Clutch Machine & Fdry. Co.
* Medart Co.

Shafting, Flexible
* Gwilliam Co.

Shafting, Turned and Polished
Cumberland Steel Co.
Hill Clutch Machine & Fdry. Co.
Link-Belt Co.

Shapes, Brick
* McLeod & Henry Co.

Shapes, Cold Drawn Steel
Union Drawn Steel Co.

Shears, Alligator
* Farrel Foundry & Machine Co.
* Long & Allstatter Co.
* Royersford Foundry & Machine Co.

Shears, Hydraulic
Mackintosh-Hemphill Co.

Shears, Plate
* Long & Allstatter Co.
Mackintosh-Hemphill Co.

Shears, Rotary
Niagara Machine & Tool Works

Shears, Squaring
Niagara Machine & Tool Works

Sheaves, Rope
* Brown, A. & F. Co.
Clyde Iron Works Sales Co.
* Falls Clutch & Machinery Co.
Hill Clutch Machine & Fdry. Co.
* Jones, W. A. Fdry. & Mach. Co.
Link-Belt Co.
Mackintosh-Hemphill Co.
* Medart Co.
* Nordberg Mfg. Co.
Wood's, T. B. Sons Co.

Sheet Metal Work
* Allington & Curtis Mfg. Co.
* Hendrick Mfg. Co.

Sheet Metal Working Machinery
* Farrel Foundry & Machine Co.
Niagara Machine & Tool Works

Sheets, Brass
* Scovill Mfg. Co.

Sheets, Bronze
* Hendrick Mfg. Co.

Sheets, Rubber, Hard
* Goodrich, B. F. Rubber Co.
* United States Rubber Co.

Sheets, Steel
Central Steel Co.

Siphons (Steam-Jet)
* Schutte & Koerting Co.

Slide Rules
Alteneder, Theo. & Sons
Dietzgen, Eugene Co.
Keuffel & Esser Co.
New York Blue Print Paper Co.
U. S. Blue Co.
Weber, F. Co. (Inc.)

Smoke Recorders
* Sarco Co. (Inc.)

Smoke Stacks and Flues
(See Stacks, Steel)

Sockets, Wire Rope
(See Wire Rope Fastenings)

Soot Blowing Systems
Diamond Power Specialty Corp'n

Space Heaters
* Westinghouse Electric & Mfg. Co.

Special Machinery
* Brown, A. & F. Co.
* Builders Iron Foundry
* Cramp, Wm. & Sons Ship & Engine Bldg. Co.
* Farrel Foundry & Machine Co.
* Fawcus Machine Co.
* Franklin Machine Co.
Hill Clutch Machine & Fdry. Co.
Lammert & Mann
Mackintosh-Hemphill Co.
* Nordberg Mfg. Co.
* Smidth, F. L. & Co.
* Vilter Mfg. Co.

Speed Reducing Transmissions
* Cleveland Worm & Gear Co.
* De Laval Steam Turbine Co.
* Foote Bros. Gear & Machine Co.
* General Electric Co.
Hill Clutch Machine & Foundry Co.
* James, D. O. Mfg. Co.
* Jones, W. A. Fdry. & Mach. Co.
Link-Belt Co.
* Palmer-Bee Co.

Spray Cooling Systems
* Cooling Tower Co. (Inc.)

Sprays, Water
* Cooling Tower Co. (Inc.)

Sprinkler Systems
Rockwood Sprinkler Co.

Sprinklers, Spray
* Cooling Tower Co. (Inc)

Sprockets
Baldwin Chain & Mfg. Co.
* Diamond Chain & Mfg. Co.
* Foote Bros. Gear & Machine Co.
* Gifford-Wood Co.
Hill Clutch Machine & Mfg. Co.
Link-Belt Co.
* Medart Co.
Philadelphia Gear Works

Stacks, Steel
* Bigelow Co.
* Casey-Hedges Co.
* Cole, R. D. Mfg. Co.
* Hendrick Mfg. Co.
Morrison Boiler Co.
* Titusville Iron Works Co.
* Union Iron Works
* Vogt, Henry Machine Co.
* Walsh & Weidner Boiler Co.

Stair Treads
* Irving Iron Works Co.

Stampings, Sheet Metal
Rockwood Sprinkler Co.

Standpipes
* Cole, R. D. Mfg. Co.
Golden-Anderson Valve Specialty Co.
Morrison Boiler Co.
* Walsh & Weidner Boiler Co.

Static Condensers
* Westinghouse Electric & Mfg Co.

Steam Specialties
* Crane Co.
Foster Engineering Co.
* Fulton Co
Golden-Anderson Valve Specialty Co.
Kieley & Mueller (Inc.)
Lunkenheimer Co.
* Pittsburgh Valve, Fdry. & Const. Co.
* Sarco Co. (Inc.)

Steel, Alloy
* Cann & Saul Steel Co.
Central Steel Co.
Union Drawn Steel Co.

Steel, Bar
* Cann & Saul Steel Co.
Central Steel Co.

Steel, Bright Finished
Union Drawn Steel Co.

Steel, Chrome
Central Steel Co.

Steel, Chrome Nickel
Central Steel Co.

*Catalogue data of firms marked * appear in the A.S.M.E. Condensed Catalogues of Mechanical Equipment, 1924-25 Volume*

and kinds of drive used to connect motors to their loads and characteristics of paper-mill loads.

Model Plant. Model Paper-Making Plant. Engineer, vol. 138, no. 3578, July 25, 1924, pp. 95–99, 12 figs. partly on p. 106. Describes working model of up-to-date paper-making plant provided by nearly three dozen different firms, under organization of Paper Makers' Assn. of Great Britain and Ireland, as a joint exhibit at British Empire Exhibition. Designed to produce a finished roll of paper, 30 in. wide, at rate of 20 ft. to 100 ft. per minute, i.e., up to 1 cwt. dry paper in an hour.

Steam Pressure and Consumption Regulation. Workings of Ruths' Steam Accumulator. Paper, vol. 34, no. 15, July 31, 1924, pp. 662–664, 4 figs. Description of installation of Ruths' steam accumulator in Lessebo sulphite and paper mills, Lessebo, Sweden, showing results obtained by regulating variations in steam pressure and consumption. Translated from article by M. Kreyssig in Wochenblatt fuer Papierfabrikation.

PIGMENTS

Oil Absorption of. The Oil Absorption of Pigments, J. H. Calbeck. Chem. & Met. Eng., vol. 31, no. 10, Sept. 8, 1924, pp. 377–382, 12 figs. A study based upon recent investigations of wetting properties of paint and varnish vehicles and upon volume relationship between vehicle and pigment. Bibliography. Paper read before Paint and Varnish Sec., Am. Chem. Soc.

PIG IRON

Judging and Mixing. The Judging and Mixing of Pig-Iron, H. J. Young. Metal Industry (Lond.) vol. 25, no. 10, Sept. 5, 1924, pp. 227–228. Author's reply to the various criticisms of his recent paper by above title.

PIPE

Joints. Pipe Joints for High Pressures and Temperatures. Power, vol. 60, no. 11, Sept. 9, 1924, pp. 396–397, 8 figs. Describes various types.

PIPE, CAST-IRON

Manufacture. Manufacture of Cast-iron Pipe in the South, R. Moldenke. Am. Inst. Min. & Met. Engrs.—Trans., Advance Paper no. 1365-S, Sept. 1924, 5 pp. Discusses some economic conditions which have made career of cast-iron pipe industry in United States a checkered one. Describes the two new developments in manufacture of cast-iron pipe, both along lines of centrifugal casting, and presents advantages and disadvantages of both processes. Statistics on production of pipe in United States at present time, as well as plants, and their capacities, so far as they are situated in South.

Modern Methods of Pipe Manufacture by the Centrifugal Process, E. J. Fox and P. H. Wilson. Foundry Trade Jl., vol. 30, no. 417, Aug. 14, 1924, pp. 131–139, 16 figs. Describes methods at works of Stanton Ironworks Co., Ltd., Stanton, operating on de Lavaud process.

PISTONS

Metals for. Use of Light and Ultra-Light Metals for Pistons of Explosion Engines (au sujet de l'emploi des alliages légers et ultra-légers pour les pistons de moteurs à explosion), M. de Fleury. Académie des Sciences, Comptes rendus des séances, vol. 178, no. 26, June 23, 1924, pp. 2161–2164. See also Génie Civil, vol. 85, no. 5, July 19, 1924, pp. 71–72. Discusses advantages of light metal from standpoint of cooling and of lightness of piston.

POWER PLANTS

Management. State Versus Private Management of Power Plants, A. T. Hadley. Engineering, vol. 118, no. 3058, Aug. 8, 1924, pp. 209–211. Concludes that history of state management creates strong presumption against encouragement of government-owned electric plants. Abstract of paper read before World Power Conference.

Railway. A Model Oil-Burning Railroad Power Plant. Ry. Age, vol. 77, no. 6, Aug. 9, 1924, pp. 237–240, 9 figs. Details of steam, air and electric power equipment of Missouri, Kansas & Texas Ry. Terminal, oil-fired boilers, evaporating 14.21 lb. water per lb. of oil, cost of generating electric power is less than one cent per kw-hr.

PRESSES

Hydraulic, Platen Design. The Design of Hydraulic Press Platens. Machy. (Lond.), vol. 24, no. 662, Aug. 28, 1924, pp. 693–694, 2 figs. Suggestions on designing of platens; table giving suitable proportions for a range of circular platens capable of withstanding working loads of from 50 to 300 tons.

PULVERIZED COAL

Pulverizers. Pulverized Coal Firing and the Kofino Pulverizer (Staubfeuerung und Kofinomühle), O. Berner. Elektrische Betrieb, vol. 22, no. 13, July 10, 1924, pp. 122–125, 8 figs. Design and construction of Kofino pulverizer plant, and examples of application.

PUMPS

British Empire Exhibition. British Empire Exhibition: Pumps and Pumping Machinery. Engineering, vol. 118, no. 3059, Aug. 15, 1924, pp. 216–220, 11 figs. Describes exhibits, including motor-driven two-throw double-acting pump and 20,000-gal. turbo boiler-feed pump of G. and J. Weir, Ltd.; emergency bilge pump and 4-in. salvage pumping set of Drysdale & Co., Ltd.; Gwynne-Pennel rotary trap; and steam turbine boiler-feed pump and other pumping machinery of Gwynnes Engineering Co., Ltd.

Classification. Classification of Pumps (Classification des Pompes), H. Meuris. Assn. des Ingénieurs sortis des Ecoles Spéciales de Gand—Annales, vol. 14, series 5, 1924, pp. 172–182, 3 figs. Shows that inventors have exhausted all possible systems and that progress must be sought in analysis of details, improvement in mechanical construction, etc.

Rotary. Positive Rotary Pumps for Oil-Engine Drive. Oil Engine Power, vol. 2, no. 9, Sept. 1924, pp. 480–482, 4 figs. Discusses characteristics of direct-connection to oil engines and pressures developed by them.

Selection. Comparison of Pumping Equipment, R. T. Livingston. Power Plant Eng., vol. 28, no. 16, Aug. 15, 1924, pp. 849–850. Discusses types of pumps and practical method of comparing pumping equipment.

PUMPS, CENTRIFUGAL

Characteristic Curves. Centrifugal Pump Characteristic Curves, W. E. W. Millington. World Power, vol. 2, no. 8, Aug. 1924, pp. 103–107, 10 figs. Indicates a method of analysis of pump characteristic curves which, in author's opinion, is much more valuable in actual practice than usual method of employing equations which have proved to be unreliable in actual use.

PYROMETERS

Uses. Modern Temperature-Measuring Apparatus (Die modernen Temperaturmessgeräte), F. Knoops. Metall u. Erz, vol. 21, no. 12, June 2, 1924, pp. 270–272. Discusses various groups of pyrometers, their field of application, advantages and drawbacks, errors in measuring, etc.

R

RAILWAY ELECTRIFICATION

Coal Carriers. Electrification of Coal Carrying Railroads, T. C. Wurts. Modern Min., vol. 1, no. 1, Aug. 1924, pp. 2–4, 5 figs. Describes electric operation of Norfolk & West. Ry.; locomotives used are split-phase type; single-phase power, at potential of 11,000 volts, is collected from trolley wire and stepped down to operating potential by means of transformers mounted on locomotive.

France. Electrification of the Paris Suburban Lines of the State Railways (Note sur L'électrification des lignes de Banlieue des chemins de fer et l'état), M. C. Thomas. Revue générale des Chemins de Fer, vol. 43, nos. 1 and 2, July and Aug. 1924, pp. 3–25 and 109–119, 30 figs. Details of lines, generating stations, permanent way, traction and transformer substations, third-rail equipment; electric locomotives rolling stock, motor coaches, etc.

Progress. Electrification Progress and Power Supply. Ry. Age, vol. 77, no. 8, Aug. 23, 1924, pp. 333–336, 1 fig. Also Ry. Elec. Engr., vol. 15, no. 9, Sept. 1924, pp. 292–299, 1 fig. Brief abstracts of several papers presented on electrification at First World Power Conference, held at Wembley, Lond., Eng., which shows status of railway electrification in various countries.

RAILWAY MOTOR CARS

Development. Automotive Rail-Cars and Their Development. Soc. Automotive Engrs.—Jl., vol. 15, no. 3, Sept. 1924, pp. 195–198. Discussion of following papers printed in June 1924 issue of Journal: The Modern Motor Rail-Car, M. L. McGrew; Motorized Railroad Equipment, E. J. Brennan; Motorization of "Light-Service" Rail-Transportation, E. Wanamaker.

Diesel-Electric. Construction of Railway Oil-Motor Cars (Der Bau der Eisenbahn-Oeltriebwagen), G. Soberski. Verkehrstechnik, no. 34, Aug. 22, 1924, pp. 355–358, 6 figs. Design, construction and equipment of cars, four-stroke, six-cylinder internal-combustion engine using light oil, 950 r.p.m., 75 hp. with coolers at each end of car, compressed air for speed change gear, storage battery for motor starting and car lighting.

Gasoline. Gasoline Motor Coaches Missouri Pacific R. R. Ry. Rev., vol. 75, no. 9, Aug. 30, 1924, pp. 307–310, 4 figs. Three new gasoline motor coaches built by J. G. Brill Co., Phila., Pa. for Missouri Pacific Ry. are of model 55 combination type having passenger and baggage compartments and are being used in districts where passenger traffic is light.

Self-Propelled Passenger Car on N. Y., N. H. & H. Ry. Mech. Engr., vol. 98, no. 9, Sept. 1924, pp. 534–537, 5 figs. Describes combination passenger and baggage unit car, propelled by a 150-hp. Ricardo engine, through a transmission consisting of one Universal hydraulic variable-delivery pump, supplying oil to two Universal hydraulic variable-speed motors, one mounted on each truck frame.

Gasoline-Electric. Distinctive Features Involved in New Gas-Electric Motor Rail Car. Ry. Rev., vol. 75, no. 10, Sept. 6, 1924, pp. 343–348, 8 figs. Describes gas-electric motor rail car built by Electro-Motive Co. in shops of St. Louis Car Co. having six-cylinder, 175-hp. gasoline engine; discusses power plant, car construction, car body, etc.

Railcar Maintains Steam Train Schedule in Four Month Test. Automotive Industries, vol. 51, no. 10, Sept. 4, 1924, pp. 432–434, 6 figs. Describes powerful car built by Nat. Steel Car Co. for Can. Nat. Rys., operating on main line between Hamilton and Toronto, Canada. Designed primarily for carrying passengers, with baggage as a secondary consideration; all-steel construction; length, 55 ft. 9½ in.; width, 8 ft. 9 in.; floor height above rails, 3 ft. 9⅜ in.; drives through mechanical gearing to one axle of each truck.

The Gas-Electric Motor Car Is Reinstated. Ry. Elec. Engr., vol. 15, no. 9, Sept. 1924, pp. 289–291, 5 figs. Also Ry. Age, vol. 77, no. 9, Aug. 30, 1924, pp. 371–378, 4 figs. No. Pacific & Chicago Great Western will use newly developed type of passenger car; cars are driven by 175-hp. gasoline engine, direct connected to 110-kw. 700-volt generator which supplies power to two railway motors mounted on power truck. Car weighs 35 tons and seats 59 persons.

Producer-Gas. Suction-Gas Motor Cars (Sauggas-Triebwagen), D. Fleck. Verkehrstechnik, no. 27, July 4, 1924, pp. 279–284, 5 figs. Details of tests on line Vorwohle-Emmenthal with suction gas and with benzol drive; consumption of anthracite 1 kg. per 1 km., cost per km. was M 0.14 to M 0.20 for suction gas with benzol addition and benzol.

RAILWAY OPERATION

Employees-Management Coöperation. Practical Method of Securing Co-operation. Ry. Age, vol. 77, no. 11, Sept. 13, 1924, pp. 453–456. Underlying principles of method in effect on Pennsylvania Railroad System for bringing about coöperation between management and employees, and manner in which it operates.

I.C.C. Report. Construction and Repair of Railway Equipment. Ry. Age, vol. 77, no. 7, Aug. 16, 1924, pp. 293–296. Interstate Commerce Commission censures six carriers for high cost of locomotive repairs in contract shops.

Statistics. Report Shows Improved Railroad Performance. Ry. Age, vol. 77, no. 7, Aug. 16, 1924, pp. 299–302, 4 figs. National Industrial Conference Board studies increased utilization of labor in train service.

Train Control. The Union Continuous Train Control. Ry. Signaling, vol. 17, no. 9, Sept. 1924, pp. 342–347, 8 figs. Discusses principles and method of operation of two-speed and three-speed systems as applied to traffic requirements.

The Union Continuous Train Control Systems. Ry. Age, vol. 77, no. 10, Sept. 6, 1924, pp. 413–416, 2 figs. Automatic train control developed by Union Switch & Signal Co. as being installed on Atchison, Topeka & Santa Fe between Chicago and Shopton, Ia., provides engineman with a continuously visible indicator on his locomotive from which he can at all times determine at what speed it is permissible to run. Development and operation of two-speed and three-speed apparatus.

RAILWAY REPAIR SHOPS

Freight-Car. New Car Repair Facilities for the D. & R. G. W. Ry. Mech. Engr., vol. 98, no. 9, Sept. 1924, pp. 540–546, 21 figs. Describes modern shops of Denver & Rio Grande Western for repairing wood and steel freight cars. Organized with station to station method and balanced gangs. Methods of repairing.

Street-Car. Repairing Street Cars at the Hillcrest Shops. Can. Machy., vol. 32, no. 9, Aug. 28, 1924, pp. 19–21, 4 figs. Toronto Transportation Commission, with 1030 cars in service, overhauls units of system in well-equipped building covering five acres of ground; discusses Jones underfeed stokers, tunnel 650 ft. long, "emergency patients" and car straightener.

RAILWAY SIGNALING

Interlocking. Mechanical Interlocking. Ry. Engr., vol. 45, no. 536, Sept. 1924, pp. 309–310, 4 figs. Gives diagrams and locking lists of Baker Street and Wembley Park stations on Metropolitan Ry.

New Reading Interlocking at Camden, A. H. Yocum. Ry. Signaling, vol. 17, no. 9, Sept. 1924, pp. 338–341, 10 figs. Electropneumatic plant with alternating current control includes unique train starting system describes tower and machine, alternating-current track circuits, air-line and conduit system, instrument and relay cases, etc.

RAILWAY SHOPS

Inspection Shops. Modern Inspection Facilities for the Interborough System. Elec. Ry. Jl., vol. 64, no. 9, Aug. 30, 1924, pp. 305–308, 6 figs. Describes two of six storage yards and inspection buildings being built by City of New York to provide for 2266 cars of Interborough Rapid Transit system.

RAILWAY TRACK

Crossings. Kensington-Delavan Grade Crossing Elimination. Ry. Rev., vol. 75, no. 11, Sept. 13, 1924, pp. 383–389, 10 figs. Erie and Lackawanna Rys. jointly eliminate two important street crossings at grade at Buffalo, N. Y.

Curves, Guard Rails for. Guard Rails on Sharp Curves, J. J. Burns. Ry. Rev., vol. 75, no. 9, Aug. 30, 1924, pp. 327–329, 5 figs. Louisville & Nashville Ry. uses new type of guard-rail fastening on lines of sharp curvature and heavy traffic.

Elevation of. Important Track Elevation Work Completed at Elyria, Ohio. Ry. Rev., vol. 75, no. 9, Aug. 30, 1924, pp. 312–315, 8 figs. Completion of work gives New York Central four tracks through Elyria, eliminating seven crossings in heart of city.

Rail Canting. Canting of Rails Now Favored by Many Roads. Ry. Age, vol. 77, no. 10, Sept. 6, 1924, pp. 404–406, 1 fig. Developments which have taken place on 36 representative roads in United States and Canada on question of canting rail inward in order to provide a bearing surface more nearly coinciding with contour of car and locomotive wheels.

Stresses. Relations of Track Stresses to Locomotive Design. Eng. News-Rec., vol. 93, no. 9, Aug. 28, 1924, p. 336. Wheel spacing, tire flanges, counterbalance important. Effect of new locomotive designs on maintenance costs. Abstract of paper read before Mech. Sec. of Am. Ry. Assn. by C. T. Ripley.

RAILWAY YARDS

Grade-Adjusting Device. Mechanical Adjustment of Grade for Gravity Switching. Eng. News-Rec., vol. 93, no. 7, Aug. 14, 1924, pp. 260–262, 4 figs. Describes "mechanical hump" for varying grade at summit of incline for gravity switching at Ecorse

Manufactured by Advertisers — CLASSIFIED LIST OF MECHANICAL EQUIPMENT — Alphabetical List on page 154

Steel, Chromium Alloy
Central Steel Co.

Steel, Cold Drawn
Union Drawn Steel Co.

Steel, Cold Rolled
Cumberland Steel Co.
Union Drawn Steel Co.

Steel, Hot Rolled
Central Steel Co.

Steel, Molybdenum
Central Steel Co.

Steel, Nickel
Central Steel Co.
Union Drawn Steel Co.

Steel, Open-Hearth
* Falk Corporation
Union Drawn Steel Co.

Steel, Rock Drill
* Ingersoll-Rand Co.

Steel, Screw, Cold Drawn
Union Drawn Steel Co.

Steel, Spring
Central Steel Co.

Steel, Strip (Cold Rolled)
Driver-Harris Co.

Steel, Tool
* Cann & Saul Steel Co.

Steel, Vanadium
Central Steel Co.
Union Drawn Steel Co.

Steel Plate Construction
Bethlehem Shipbldg.Corp'n(Ltd.)
* Bigelow Co.
* Burhorn, Edwin Co.
* Casey-Hedges Co.
* Cole, R. D. Mfg. Co.
* Graver Corp'n
* Hendrick Mfg. Co.
* Keeler, E. Co.
Morrison Boiler Co.
Steere Engineering Co.
* Titusville Iron Works Co.
* Union Iron Works
* Vogt, Henry Machine Co.
* Walsh & Weidner Boiler Co.

Steps, Ladder & Stair (Non-Slipping)
* Irving Iron Works Co.

Stills
* Vogt, Henry Machine Co.

Stocks and Dies
* Landis Machine Co. (Inc.)

Stokers, Chain Grate
* Babcock & Wilcox Co.
* Combustion Engineering Corp'n
* Riley, Sanford Stoker Co.
* Westinghouse Electric & Mfg. Co.

Stokers, Overfeed
* Detroit Stoker Co.
* Riley, Sanford Stoker Co.
* Westinghouse Electric & Mfg. Co.

Stokers, Underfeed
* American Engineering Co.
* Combustion Engineering Corp'n
* Detroit Stoker Co.
* Riley, Sanford Stoker Co.
Sturtevant, B. F. Co.
* Westinghouse Electric & Mfg. Co.

Strainers, Oil
* Bowser, S. F. & Co. (Inc.)
* Mason Regulator Co.

Strainers, Steam
Foster Engineering Co.
Kieley & Mueller (Inc.)
* Mason Regulator Co.

Strainers, Water
Elliott Co.
Foster Engineering Co.
Golden-Anderson Valve Specialty Co.
Kieley & Mueller (Inc.)
* Mason Regulator Co.
* Schutte & Koerting Co.

Strainers, Water (Traveling)
Link-Belt Co.

Structural Steel Works
* Hendrick Mfg. Co.
* Walsh & Weidner Boiler Co.

Sugar Machinery
* Farrel Foundry & Machine Co.
* Walsh & Weidner Boiler Co.

Superheater, Steam
* Babcock & Wilcox Co.
* Power Specialty Co.
* Superheater Co.

Superheaters, Steam (Locomotive)
* Power Specialty Co.
* Superheater Co.

Superheaters, Steam (Marine)
* Power Specialty Co.
* Superheater Co.

Switchboards
* General Electric Co.
* Westinghouse Electric & Mfg. Co.

Switches, Electric
* General Electric Co.
* Westinghouse Electric & Mfg. Co.

Synchronous Converters
(See Converters, Synchronous)

Tables, Drawing
Dietzgen, Eugene Co.
Economy Drawing Table & Mfg. Co.
Keuffel & Esser Co.
New York Blue Print Paper Co.
U. S. Blue Co.
Weber, F. Co. (Inc.)

Tachometers
* American Schaeffer & Budenberg Corp'n
* Bristol Co.
Veeder Mfg. Co.

Tachoscopes
* American Schaeffer & Budenberg Corp'n

Tanks, Acid
* Graver Corp'n
* Walsh & Weidner Boiler Co.

Tanks, Ice
* Frick Co. (Inc.)
* Graver Corp'n

Tanks, Oil
* Graver Corp'n
* Hendrick Mfg. Co.
Morrison Boiler Co.
* Scaife, Wm. B. & Sons Co.
* Titusville Iron Works Co.
* Walsh & Weidner Boiler Co.

Tanks, Pressure
* Graver, Corp'n
* Hendrick Mfg. Co.
* Ingersoll-Rand Co.
Morrison Boiler Co.
* Titusville Iron Works Co.
* Vogt, Henry Machine Co.
* Walsh & Weidner Boiler Co.

Tanks, Steel
Bethlehem Shipbldg.Corp'n(Ltd.)
* Bigelow Co.
* Casey-Hedges Co.
* Cole, R. D. Mfg. Co.
* Graver Corp'n
* Hendrick Mfg. Co.
Morrison Boiler Co.
* Scaife, Wm. B. & Sons Co.
* Titusville Iron Works Co.
* Union Iron Works
* Vogt, Henry Machine Co.
* Walsh & Weidner Boiler Co.

Tanks, Storage
* Cochrane Corp'n
* Cole, R. D. Mfg. Co.
* Combustion, Engineering Corp'n
* Graver Corp'n
* Hendrick Mfg. Co.
Morrison Boiler Co.
* Scaife, Wm. B. & Sons Co.
* Titusville Iron Works Co.
* Vogt, Henry Machine Co.
* Walsh & Weidner Boiler Co.

Tanks, Tower
* Graver Corp'n
* Walsh & Weidner Boiler Co.

Tanks, Welded
* Cole, R. D. Mfg. Co.
* Graver Corp'n
Morrison Boiler Co.
* Scaife, Wm. B. & Sons Co.

Tap Extensions
Allen Mfg. Co.

Tapping Attachments
* Whitney Mfg. Co.

Temperature Regulators
(See Regulators, Temperature)

Testing Laboratories, Cement
* Smidth, F. L. & Co.

Textile Machinery
* Franklin Machine Co.
* Tolhurst Machine Works

Thermometers
* American Schaeffer & Budenberg Corp'n
* Ashton Valve Co.
* Bristol Co.
Moto Meter Co.
* Sarco Co. (Inc.)
* Tagliabue, C. J. Mfg. Co.

Thermometers, Chemical
* Tagliabue, C. J. Mfg. Co.

Thermometers, High Range (Recording)
* Bailey Meter Co.
* Tagliabue, C. J. Mfg. Co.

Thermometers, Industrial
Moto Meter Co.
* Tagliabue, C. J. Mfg. Co.

Thermostats
* Bristol Co.
* Fulton Co.
* General Electric Co.

Thread Cutting Tools
* Crane Co.
* Jones & Lamson Machine Co.
* Landis Machine Co. (Inc.)

Threading Machines, Pipe
* Landis Machine Co. (Inc).

Tie Tamping Outfits
* Ingersoll-Rand Co.

Time Recorders
* Bristol Co.

Tinsmiths' Tools and Machines
Niagara Machine & Tool Works

Tipples, Steel
Link-Belt Co.

Tools, Brass-Working Machine
* Warner & Swasey Co.

Tools, Machinist's Small
* Atlas Ball Co.

Tools, Pneumatic
* Ingersoll-Rand Co.

Tracks, Overhead
* Palmer-Bee Co.

Tractors
* Allis-Chalmers Mfg. Co.

Tractors, Turntable
* Whiting Corp'n

Tramrail Systems, Overhead
* Brown Hoisting Machinery Co.
Link-Belt Co.
* Shepard Electric Crane & Hoist Co.
* Whiting Corp'n

Tramways, Bridge
Link-Belt Co.

Tramways, Wire Rope
Clyde Iron Works Sales Co.
Lidgerwood Mfg. Co.
* Roebling's, John A. Sons Co.

Transfer Tables
* Whiting Corp'n

Transformers, Electric
* Allis-Chalmers Mfg. Co.
* General Electric Co.
* Westinghouse Electric & Mfg. Co.

Transmission Machinery
(See Power Transmission Machinery)

Transmissions, Automobile
* Foote Bros. Gear & Machine Co.

Transmissions, Variable Speed
* American Fluid Motors Co.
* Foote Bros. Gear & Machine Co.

Traps, Radiator
* American Radiator Co.
* Sarco Co. (Inc.)

Traps, Return
* American Blower Co.
* Crane Co.
Kieley & Mueller (Inc.)

Traps, Steam
* American Blower Co.
* American Schaeffer & Budenberg Corp'n
* Crane Co.
Elliott Co.
Golden-Anderson Valve Specialty Co.
* Jenkins Bros.
Johns-Manville (Inc.)
Kieley & Mueller (Inc.)
* Reading Steel Casting Co. (Inc.)
(Pratt & Cady Division)
* Sarco Co. (Inc.)
* Schutte & Koerting Co.
Squires, C. E. Co.
* Vogt, Henry Machine Co.

Traps, Vacuum
* American Blower Co.
* American Schaeffer & Budenberg Corp'n
* Crane Co.
* Sarco Co. (Inc.)

Treads
* Irving Iron Works Co.

Treads, Stair (Rubber)
* United States Rubber Co.

Trolleys
* Brown Hoisting Machine Co.
* Whiting Corp'n

Trolleys, Monorail
* Palmer-Bee Co.

Tube Cleaners, Condenser
Condenser Cleaners Mfg. Co.

Tubes, Boiler, Seamless Steel
* Casey-Hedges Co.

Tubes, Condenser
* Scovill Mfg. Co.
* Wheeler Condenser & Engrg. Co.

Tubes, Pitot
* American Blower Co.
Bacharach Industrial Instrument Co.

Tubing, Rubber
* Goodrich, B. F. Rubber Co.
* United States Rubber Co.

Tubing, Rubber (Hard)
* Goodrich, B. F. Rubber Co.

Tumbling Barrels
* Farrel Foundry & Machine Co.
* Royersford Fdry. & Mach. Co.
* Whiting Corp'n

Turbines, Hydraulic
* Allis-Chalmers Mfg. Co.
* Cramp, Wm. & Sons Ship & Engine Bldg. Co.
* Leffel, James & Co.
Newport News Shipbuilding & Dry Dock Co.
Smith, S. Morgan Co.
* Worthington Pump & Machry. Corp'n

Turbines, Steam
* Allis-Chalmers Mfg. Co.
* Coppus Engineering Corp'n
* De Laval Steam Turbine Co.
* General Electric Co.
Kerr Turbine Co.
Ridgway Dynamo & Engine Co.
Sturtevant, B. F. Co.
* Terry Steam Turbine Co.
* Westinghouse Electric & Mfg. Co.
* Wheeler Condenser & Engrg. Co.

Turbo-Blowers
* Coppus Engineering Corp'n
* General Electric Co.
* Ingersoll-Rand Co.
Kerr Turbine Co.
Sturtevant, B. F. Co.

Turbo-Compressors
* Ingersoll-Rand Co.

Turbo-Generators
* Allis-Chalmers Mfg. Co.
* De Laval Steam Turbine Co.
* General Electric Co.
Kerr Turbine Co.
Ridgway Dynamo & Engine Co.
Sturtevant, B. F. Co.
* Terry Steam Turbine Co.
* Westinghouse Electric & Mfg. Co.

Turbo-Pumps
Bethlehem Shipbldg.Corp'n(Ltd.)
* Coppus Engineering Corp'n
Kerr Turbine Co.
* Terry Steam Turbine Co.
* Wheeler Condenser & Engineering Co.

Turntables
Link-Belt Co.
* Palmer-Bee Co.
* Whiting Corp'n

Turret Machines
(See Lathes, Turret)

Unions
* Crane Co.
* Edward Valve & Mfg. Co.
Lunkenheimer Co.
* Pittsburgh Valve, Fdry. & Const. Co.
* Vogt, Henry Machine Co.

Unions, Pressed Steel
Rockwood Sprinkler Co.

Unloaders, Air, Compressors
* Ingersoll-Rand Co.
* Worthington Pump & Machinery Corp'n

Unloaders, Ballast
Lidgerwood Mfg. Co.

Unloaders, Car
* Gifford-Wood Co.
Link-Belt Co.

Vaccum Breakers
Foster Engineering Co.

Vacuum Dryers, Pans, Pumps, Traps, etc.
(See Pans, Pumps, Traps, etc., Vacuum)

Valve Discs
* Edward Valve & Mfg. Co.
* Garlock Packing Co.
* Goodrich, B. F. Rubber Co.
* Jenkins Bros.
* Reading Steel Casting Co. (Inc.)
(Pratt & Cady Division)
* United States Rubber Co.

*Catalogue data of firms marked * appear in the A.S.M.E. Condensed Catalogues of Mechanical Equipment, 1924-25 Volume*

freight yard at new Detroit terminals of Pennsylvania, Detroit R. R.; table which forms summit of hump raised and lowered by jacks; starting grade varied from 1 to 3 per cent.

REFRIGERATING MACHINES

Packing for. Packing for Refrigerating Machines, B. E. Seamon. South. Engr., vol. 41, no. 7, Sept. 1924, pp. 39–41. Requirements of suitable packing for rod stuffing boxes on refrigerating machines.

REFRIGERATING PLANTS

Rules and Formulas for. Some Rules and Formulae for the Refrigeration Engineer, W. H. Motz. Refrigerating Eng., vol. 11, no. 2, Aug. 1924, pp. 51–56 and (discussion) 56–60 and 64–65. Gives general rules and formulas concerning mechanical equipment of ice-making and refrigerating plants; rules pertain to displacements, speeds, and power requirements of compressors; heat removed in condensers; water and surface requirements for condensers; capacities of ammonia receivers; refrigerating coils in air, evaporators for refrigerating liquids; quantity of brine and power requirements of brine circulation systems; refrigeration pipe, cans per ton of ice.

ROLLING MILLS

Power Consumption. Power Consumed in Rolling Steel, G. Fox. Iron & Coal Trades Rev., vol. 109, no. 2945, Aug. 8, 1924, pp. 235–236, 13 figs. Discusses ratio of demand to connected load, power consumption by main roll drives, power consumption and elongation, power consumption and rate of rolling. Abstract of paper read before Am. Iron & Steel Inst.

Time Study and Measuring Power Consumption in Rolling Mills (Zeitstudiny und Kraftverbrauchsmessungen im Walzwerk), G. Bulle. Stahl u. Eisen, vol. 44, no. 32, Aug. 7, 1924, pp. 937–941, 5 figs. Discusses formulation of rolling plan, determining times for rolling and handling by stop watch, training of workers, works inspection, furnace improvements.

ROLLS

Hardened and Ground. Hardened and Ground Rolls, J. R. Adams. Foundry Trade Jl., vol. 30, no. 420, Sept. 4, 1924, pp. 200–201. Comparison of hardened-steel and chilled-iron rolls; melting and forging, annealing and machining, hardening, grinding. Extract from paper read before Am. Iron & Steel Inst.

S

SAFETY CODES

Aeronautical. The American Aeronautical Safety Code, A. Halsted. Nat. Safety News, vol. 10, no. 3, Sept. 1924, pp. 27–29, 4 figs. Purpose of code is to establish uniform safety standards for construction and maintenance of aircraft and for their operation and flight, especially at airdromes.

SAND, MOLDING

Research Work. Research Work on Molding Sand—New and Old. Can. Foundryman, vol. 15, no. 9, Sept. 1924, p. 19. Extracts from tentatively adopted standardized testing methods and résumé of activities of joint committee on molding sand research.

Testing. Report on Molding Sand Tests. Foundry, vol. 52, no. 17, Sept. 1, 1924, pp. 675–680, 4 figs. Report of joint committee on molding sand research, Am. Foundrymen's Assn., giving tests for determining fineness and dye absorption properties, and methods for sampling shipments of sand.

SCREW THREADS

Copper. Comparison between Cold-Rolled and Cut Threads, Especially in Copper Screws (Vergleich zwischen kalt gerollten und geschnittenen gewinden, besonders bei Kupferschrauben), M. v. Schwarz. Werkstattstechnik, vol. 18, no. 14, July 15, 1924, pp. 369–372, 10 figs. Discusses increased application of cold rolling instead of cutting, and its advantages in bending, not cutting, fiber; shown by micrographs.

Cutting. Threading Tool and Gage Forms for the New Screw Thread Standard, R. E. Flanders. Am. Mach., vol. 61, no. 13, Sept. 25, 1924, pp. 481–486, 15 figs. Consideration of important points in manufacture of threads conforming to new Am. (National) Screw Thread Standards. Shape of cutting edges for threading tools and taps; proper outlines for gage points; preparation of charts for inspection by optical projection; Hartness comparator.

Standards. American Standard Screw Threads. Am. Mach., vol. 61, nos. 10, 11 and 12, Sept. 4, 11 and 18, 1924, pp. 383–387, 421–422 and 457–460, 3 figs. Standardization and unification approved by Am. Eng. Standards Committee, May 1924. For bolts, machine screws, nuts and commercially tapped holes.

Worm. The Gauging of Finish-ground Worms by Cylinders, H. E. Merritt. Engineer, vol. 138, no. 3580, Aug. 8, 1924, pp. 162–163, 3 figs. Shows that from certain fundamental worm dimensions size and position of a cylinder to gage any point on thread contour may be calculated, and in spite of apparent difficulty of problem, solution is very simple and easy of application.

SOLDERING

Fluxes for. Fluxes for Soft Soldering, T. B. Crow. Metal Industry (Lond.), vol. 25, no. 10, Sept. 5, 1924, pp. 224–226, 9 figs. Definitions; theory of soldering; experimental work carried out in connection with cleaning and protective properties of various fluxes, efficiency in causing solder to wet surface, efficiencies of tallow and resin as fluxes, influence of flux on surface tension of solder; tests under hydrogen. Contribution to a general discussion on "Fluxes and Slags in Metal Melting and Working" held by Faraday Soc. and Inst. of Metals with coöperation of British Non-Ferrous Metals Research Assn. and Inst. Brit. Foundrymen.

SOOT BLOWERS

Mechanical. Tests of Mechanical Soot Blowers, R. June. Power, vol. 60, no. 9, Aug. 26, 1924, pp. 326–328, 4 figs. Describes tests made on an oil-fired horizontal water-tube boiler and on 12,000-sq. ft. boilers. They confirm some of the general claims that have been made from a strictly fuel-saving point of view.

SPRINGS

Coiled. Study on Coiled Springs (Une étude sur les ressorts enroulés), D. Landau. Technique Automobile et Aérienne, vol. 15, no. 125, 1924, pp. 47–49, 2 figs. Discusses helical, conical and spiral springs, and gives formulas for calculating tensile and bending stresses for various cross-sections and a table of coefficients.

STANDARDS

German. Report of the German Industrial Standards Committee (Normenausschussder deutschen Industrie). Maschinenbau, vol. 3, no. 22, Aug. 28, 1924, pp. N131–N138, 4 figs. Proposals for standards for seamless drawn brass tubes for stuffing boxes, graphic symbols for pipe lines.

Report of German Industrial Standards Committee (Normenausschuss der Deutschen Industrie), Maschinenbau, vol. 3, no. 19, July 10, 1924, pp. N123–N130. Square-head screws, parallel measures, screw micrometer, linear measures.

STEAM

Pressure-Volume-Temperature Relation. M.I.T. Investigates Pressure-Volume-Temperature Relation of Steam, P. W. Swain. Power, vol. 60, no. 8, Aug. 19, 1924, pp. 284–286, 5 figs. Describes apparatus and methods employed at Mass. Inst. Technology for determining volume of water at various temperatures and relation between pressure, temperature and volume of saturated and superheated steam.

Production from By-Product Producer Gas. Power and Process Steam From By-product Producer Gas, C. H. S. Tupholme. Chem. & Met. Eng., vol. 31, no. 8, Aug. 25, 1924, pp. 300–303, 6 figs. Description of a highly efficient combination system evolved for plants using steam in course of production.

STEAM ACCUMULATORS

Ruths. First Experience and Trials with a Ruth Steam Accumulator Plant in Germany (Erste Erfahrungen und Versuche an einer Dr. Ruths-Speicheranlage in Deutschland), R. Schulze. Wärme, vol. 47, nos. 23 and 24, June 6 and 13, 1924, pp. 261–264 and 274–276, 14 figs. Discusses operation of accumulators, heat losses, efficiency of boiler plant with and without accumulator. June 13: Storage capacity, efficiency of boiler plant.

STEAM ENGINES

Indicator Diagrams. Study of Indicator Diagrams Made Easy, E. K. Benedek. Power, vol. 60, no. 7, Aug. 12, 1924, pp. 255–256, 6 figs. Discusses construction of characteristic lines and gives simple method of diagram analysis.

Power Calculation. New Method for Calculating Power of Reciprocating Engines (Méthode nouvelle pour calculer la puissance de la machine à piston), E. Tournier. Académie des Sciences—Comptes rendus des séances, vol. 179, no. 2, July 16, 1924, pp. 101–102. Gives formula for calculating hp. from weight of dry steam, adiabatic drop per unit weight of steam, actual condenser pressure, loss of steam, and maximum efficiency of engine.

Uniflow. Comparison of Four-Valve and Two-Valve Unaflow Engines, M. L. Barker. Power, vol. 60, no. 8, Aug. 19, 1924, pp. 289–290, 4 figs. Results of tests.

STEAM PIPES

Expansion. Compensation of the Linear Expansion of Steam Pipes, H. Menk. Eng. Progress, vol. 5, no. 7, July 1924, pp. 128–138, 8 figs. Discusses heat expansion of long piping and connecting by application of compensators between sections of pipe line, flexible compensating pipe, jointed compensation, pipe glands, etc.

STEAM POWER PLANTS

Automobile. Steam Plant of Fisher Body Corporation, C. K. Little. Power, vol. 60, no. 7, Aug. 12, 1924, pp. 240–243, 3 figs. Discusses plant of automobile body manufacturer having 30,000 sq. ft. of boiler heating surface; fuel is mixture of coal and lumber scrap, resulting in saving.

Carolina Power & Light Co. Cape Fear Steam Plant of Carolina Power and Light Co. So. Engr., vol. 41, no. 6, Aug. 1924, pp. 35–42, 16 figs. Describes plant of ultimate capacity of 60,000 kw.; present installation: one 15,000 kw. turbo-generator, three 11,360-sq-ft. water-tube boilers; pressure, 325 lb.; superheat, 210 to 240 deg. fahr.

Development. High Lights from the World Power Conference, A. L. Rice. Power Plant Eng., vol. 28, no. 16, Aug. 15, 1924, pp. 862–866, 3 figs. Economics of power development; advances in boiler practice; effect of high pressures on turbine design.

Paper Plant, Passaic, N. J. Methods of Operation at the Paterson Parchment Paper Co. Power Plant Eng., vol. 28, no. 18, Sept. 15, 1924, pp. 932–936, 10 figs. Operation of plant is characterized by engineering qualities of high excellence. Describes methods of determining coal consumption, boiler operation, engine equipment, and gives details of maintenance and operation.

Pulverized-Anthracite-Slush Burning. Susquehanna Collieries Co. Burns Pulverized Anthracite Slush at Lykens, Pa. Coal Age, vol. 26, no. 8, Aug. 21, 1924, pp. 253–257, 10 figs. One of the first power plants to utilize anthracite slush in pulverized form. Coal mixed with 75 per cent water pumped to plant; boiler plant contains six 5000- and six 6000-sq. ft. water-tube boilers; present generating capacity, 6400 kw.

STEAM TURBINES

Brunner. Brunner High-Pressure Turbine Shows Improved Economy. Power, vol. 60, no. 13, Sept. 23, 1924, pp. 498–500, 4 figs. Steam velocities below those of usual practice are among refinements contributing to an efficiency, when non-condensing, comparable with uniflow engine.

Development. Evolution of Steam Turbines (L'évolution de la turbine à vapeur), C. Monteil. Technique Moderne, vol. 16, nos. 14 and 16, July 15 and Aug. 15, 1924, pp. 469–474 and 533–541, 22 figs. July 15: Discusses reaction in hydraulics and in steam turbines, Brown-Boveri-Parsons turbines; stages of speed and multiple turbine wheels, etc. Aug. 15: Discusses adaptibility of steam turbines for high pressures, power factors, difficulties of last wheel; describes 40,000-kw. turbines of 1500 r.p.m., 12,000 to 15,000-kw. of 3000 r.p.m.; application of low-power turbines, use of high pressures and high superheating.

Extra-High-Pressure. Extra High-Pressure Steam Turbines, V. Nordström. Engineering, vol. 118, no. 3057, Aug. 1, 1924, pp. 178–179. Discusses recent developments to obtain better utilization of working power of steam by means of increased steam pressure, contemplating 30 kg. per sq. cm. and even 50 to 100 kg. per sq. cm.; also activity of De Laval Co. Abstract of paper of World Power Conference.

High-Pressure. Steam at 1,200 Deg. F. in a Unique Power Plant. Power, vol. 60, no. 1, Sept. 9, 1924, pp. 405–406, 1 fig. A turbine for 1200 deg. fahr., 350 lb., supplied by a boiler where fuel and water are intimately mixed, at high combustion efficiency: used for propelling torpedoes. Features suggest possibilities for more economical stationary practice.

Improving Efficiency of. Steam Turbines, C. Parsons. Engineer, vol. 138, no. 3579, Aug. 1, 1924, pp. 140–142, 4 figs. Describes four methods of improving thermal efficiency of thermodynamic cycle without going to higher maximum temperature, and their application in turbine plant of 50,000-kw. power station to be erected at Crawford Avenue, Chicago, now nearing completion at Newcastle-on-Tyne. Abstract of paper read at World Power Conference.

Marine. See MARINE STEAM TURBINES.

STEEL

Magnetic Testing of. Field of Magnetic Testing Broad. Iron Trade Rev., vol. 75, no. 11, Sept. 11, 1924, pp. 663–665, 4 figs. Developments in magnetic method of examining steel open way to many new applications, particularly in case of irregular shapes; employment of method on regular shapes commercialized.

Melting in Cupola. Melting Steel in a Cupola, J. Grennan. Am. Foundrymen's Assn., Preprint No. 411, for Mtg. Oct. 11–16, 1924, 17 pp., 11 figs. Data of experiments conducted with a view to observing what actually happens to steel when it is melted in a cupola and to compare melting of steel with that of pig iron and scrap cast iron.

Parts, Hot-Pressing of. Hot-pressing Steel Parts. Machy. (Lond.), vol. 24, no. 612, Aug. 28, 1924, pp. 681–682, 4 figs. New application of a process heretofore employed only in manufacturing parts from softer metals. Now possible to hot-press steel parts in an almost endless variety of shapes. Briefly, process consists of heating slugs of steel to about 1800 deg. fahr. and then pressing them to desired shape in tungsten-steel dies having cavities corresponding to outside of desired part.

Special, Metallurgy of. Modern Developments in the Metallurgy of Special Steels, W. H. Hatfield. Iron & Coal Trades Rev., vol. 108, no. 2938, June 20, 1924, pp. 1055–1057. Discusses improvement in process of manufacture and manipulation resulting in increases reliability, modified and new composition resulting in improved or new properties, more intimate knowledge of properties of steel from designers' standpoint. Abstract of paper read before Iron & Steel Sec., Empire Min. & Metallurgical Congress.

Thermal Expansion. Thermal Expansion of Soft and Hardened Steel (Thermische Ausdehnung von weichem und gehärtetem Stahl), A. Werner. Zeit. für Instrumentenkunde, vol. 44, no. 7, July 1924, pp. 315–320. Results of experiments with 34 samples of soft and hardened steels at temperatures from —200 deg. to +150 deg. C., details of expansions, effect of chemical composition, etc.

STEEL CASTINGS

Cleaning. Cleaning Steel Castings Economically. Foundry, vol. 52, no. 17, Sept. 1, 1924, pp. 688–690, 6 figs. Notes on methods of Ohio Steel Foundry Co., Springfield, O.

Production. The Production of a Large Steel Casting, H. V. Fell. Foundry Trade Jl., vol. 30, no. 416, Aug. 7, 1924, pp. 114–116, 18 figs. Describes an example of this class of work as carried out by a large British firm, especially molding operations.

Semi-Steel, Manufacture of. The Making of Semi-Steel Castings, G. W. Gilderman. Foundry Trade Jl., vol. 30, no. 413, July 17, 1924, pp. 44–45. Discusses mixtures and charging, preparation of mold, pattern proportion, and alloys.

X-Ray Examination. Technic of X-Ray Is Improving. Iron Trade Rev., vol. 75, no. 11, Sept. 11, 1924, pp. 668–671, 7 figs. Experience at Watertown arsenal, Watertown, Mass., in application of X-ray process to steel castings yields more accurate and definite results. Interpretation of radiographs are reduced to formulas.

Manufactured by Advertisers

CLASSIFIED LIST OF MECHANICAL EQUIPMENT

Alphabetical List on page 154

Valves, Air, Automatic
* Fulton Co.
* Jenkins Bros.
* Simplex Valve & Meter Co.
* Smith, H. B. Co.

Valves, Air (Operating)
Foster Engineering Co.

Valves, Air, Relief
* American Schaeffer & Budenberg Corp'n
Foster Engineering Co.
* Fulton Co.
Lunkenheimer Co.
* Nordberg Mfg. Co.
* Schutte & Koerting Co.

Valves, Altitude
Foster Engineering Co.
Golden-Anderson Valve Specialty Co.
* Simplex Valve & Meter Co.

Valves, Ammonia
* American Schaeffer & Budenberg Corp'n
* Crane Co.
* De La Vergne Machine Co.
Foster Engineering Co.
* Jenkins Bros.
Lunkenheimer Co.
* Reading Steel Casting Co. (Inc.)
(Pratt & Cady Division)
* Vilter Mfg. Co.
* Vogt, Henry Machine Co.

Valves, Back Pressure
* Cochrane Corp'n
* Crane Co.
* Edward Valve & Mfg. Co.
Foster Engineering Co.
* Jenkins Bros.
Kieley & Mueller (Inc.)
* Pittsburgh Valve, Fdry. & Const. Co.
* Reading Steel Casting Co. (Inc.)
(Pratt & Cady Division)
* Schutte & Koerting Co.

Valves, Balanced
* Crane Co.
Foster Engineering Co.
Golden-Anderson Valve Specialty Co.
Kieley & Mueller (Inc.)
Lunkenheimer Co.
* Mason Regulator Co.
* Nordberg Mfg. Co.
* Schutte & Koerting Co.

Valves, Blow-off
* Ashton Valve Co.
* Bowser, S. F. & Co. (Inc.)
* Crane Co.
* Crosby Steam Gage & Valve Co.
* Edward Valve & Mfg. Co.
Elliott Co.
* Jenkins Bros.
Lunkenheimer Co.
* Pittsburgh Valve, Fdry. & Const. Co.
* Reading Steel Casting Co. (Inc.)
(Pratt & Cady Division)

Valves, Butterfly
* Chapman Valve Mfg. Co.
* Crane Co.
Lunkenheimer Co.
* Pittsburgh Valve, Fdry. & Const. Co.
* Schutte & Koerting Co.

Valves, Check
* American Schaeffer & Budenberg Corp'n
* Bowser, S. F. & Co. (Inc.)
* Chapman Valve Mfg. Co.
* Crane Co.
* Crosby Steam Gage & Valve Co.
* Edward Valve & Mfg. Co.
* Jenkins Bros.
* Kennedy Valve Mfg. Co.
Lunkenheimer Co.
* Nordberg Mfg. Co.
* Pittsburgh Valve, Fdry. & Const. Co.
* Reading Steel Casting Co. (Inc.)
(Pratt & Cady Division)
* Schutte & Koerting Co.
* Vogt, Henry Machine Co.
* Worthington Pump & Machinery Corp'n

Valves, Chronometer
Foster Engineering Co.

Valves, Combined Back Pressure and Relief
Foster Engineering Co.

Valves, Diaphragm
Foster Engineering Co.

Valves, Electrically Operated
* Chapman Valve Mfg. Co.
* Dean, Payne (Ltd.)
* General Electric Co.
Golden-Anderson Valve Specialty Co.
* Kennedy Valve Mfg. Co.
Lunkenheimer Co.
* Pittsburgh Valve, Fdry. & Const. Co.
* Reading Steel Casting Co. (Inc.)
(Pratt & Cady Division)
* Schutte & Koerting Co.

Valves, Exhaust Relief
* Cochrane Corp'n
* Crane Co.
* Edward Valve & Mfg. Co.
Foster Engineering Co.
* Jenkins Bros.
Kieley & Mueller (Inc.)
* Pittsburgh Valve, Fdry. & Const. Co.
* Schutte & Koerting Co.
* Wheeler, C. H. Mfg. Co.
* Wheeler Cond. & Engrg. Co.

Valves, Float
* American Schaeffer & Budenberg Corp'n
* Crane Co.
* Dean, Payne (Ltd.)
Foster Engineering Co.
Golden-Anderson Valve Specialty Co.
Kieley & Mueller (Inc.)
* Mason Regulator Co.
* Pittsburgh Valve, Fdry. & Const. Co.
* Schutte & Koerting Co.
* Simplex Valve & Meter Co.

Valves, Foot
* Crane Co.
* Pittsburgh Valve, Fdry. & Const. Co.
* Worthington Pump & Machinery Corp'n

Valves, Fuel Oil Shut-off
* Tagliabue, C. J. Mfg. Co.

Valves, Gate
* Chapman Valve Mfg. Co.
* Crane Co.
* Jenkins Bros.
* Kennedy Valve Mfg. Co.
Lunkenheimer Co.
* Pittsburgh Valve, Fdry. & Const. Co.
* Reading Steel Casting Co. (Inc.)
(Pratt & Cady Division)
* Schutte & Koerting Co.

Valves, Globe, Angle and Cross
* Bowser, S. F. & Co. (Inc.)
* Crane Co.
* Crosby Steam Gage & Valve Co.
* Edward Valve & Mfg. Co.
Golden-Anderson Valve Specialty Co.
* Jenkins Bros.
* Kennedy Valve Mfg. Co.
Lunkenheimer Co.
* Pittsburgh Valve, Fdry. & Const. Co.
* Reading Steel Casting Co. (Inc.)
(Pratt & Cady Division)
* Vogt, Henry Machine Co.

Valves, Hose
* Chapman Valve Mfg.Co.
* Crane Co.
* Jenkins Bros.
* Kennedy Valve Mfg. Co.
Lunkenheimer Co.
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Valves, Hydraulic
* Chapman Valve Mfg. Co.
* Crane Co.
* Crosby Steam Gage & Valve Co.
* Edward Valve & Mfg. Co.
Lunkenheimer Co.
* Pittsburgh Valve, Fdry. & Const. Co.
* Reading Steel Casting Co. (Inc.)
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* Schutte & Koerting Co.
* Vogt, Henry Machine Co.

Valves, Hydraulic Operating
* Chapman Valve Mfg. Co.
* Kennedy Valve Mfg. Co.
Lunkenheimer Co.
* Pittsburgh Valve, Fdry. & Const. Co.
* Reading Steel Casting Co. (Inc.)
(Pratt & Cady Division)
* Schutte & Koerting Co.

Valves, Non-Return
* Crane Co.
* Crosby Steam Gage & Valve Co.
* Edward Valve & Mfg. Co.
Foster Engineering Co.
Golden-Anderson Valve Specialty Co.
* Jenkins Bros.
Kieley & Mueller (Inc.)
Lunkenheimer Co.
* Pittsburgh Valve, Fdry. & Const. Co.
* Reading Steel Casting Co. (Inc.)
(Pratt & Cady Division)
* Schutte & Koerting Co.

Valves, Plug
* Chapman Valve Mfg. Co.
* Reading Steel Casting Co. (Inc.)
(Pratt & Cady Division)

Valves, Pop Safety
* American Schaeffer & Budenberg Corp'n
* Ashton Valve Co.
* Crane Co.
* Crosby Steam Gage & Valve Co.
Lunkenheimer Co.

Valves, Pump
* Bowser, S. F. & Co. (Inc.)
* Garlock Packing Co.
* Goulds Mfg. Co.
* Jenkins Bros.
Johns-Manville (Inc.)
* Nordberg Mfg. Co.
* United States Rubber Co.

Valves, Radiator
* American Radiator Co.
* Crane Co.
* Dean, Payne (Ltd.)
* Fulton Co.
* Jenkins Bros.
* Kennedy Valve Mfg. Co.
Lunkenheimer Co.
* Reading Steel Casting Co. (Inc.)
(Pratt & Cady Division)

Valves, Radiator, Packless
* American Radiator Co.
* Fulton Co.

Valves, Reducing
* Edward Valve & Mfg. Co.
Elliott Co.
Foster Engineering Co.
* Fulton Co.
Golden-Anderson Valve Specialty Co.
Kieley & Mueller (Inc.)
* Mason Regulator Co.
Squires, C. E. Co.
* Tagliabue, C. J. Mfg. Co.

Valves, Regulating
* Crane Co.
* Dean, Payne (Ltd.)
* Edward Valve & Mfg. Co.
Foster Engineering Co.
* Fulton Co.
Golden-Anderson Valve Specialty Co.
Kieley & Mueller (Inc.)
Lunkenheimer Co.
* Simplex Valve & Meter Co.

Valves, Relief (Water)
* American Schaeffer & Budenberg Corp'n
* Ashton Valve Co.
* Crane Co.
* Crosby Steam Gage & Valve Co.
* Edward Valve & Mfg. Co.
Foster Engineering Co.
Golden-Anderson Valve Specialty Co.
Lunkenheimer Co.

Valves, Safety
* American Schaeffer & Budenberg Corp'n
* Crane Co.
* Crosby Steam Gage & Valve Co.
* Jenkins Bros.
Lunkenheimer Co.

Valves, Stop and Check
(See Valves, Non-Return)

Valves, Superheated Steam (Steel)
* Bowser, S. F. & Co. (Inc.)
* Chapman Valve Mfg. Co.
* Crane Co.
* Edward Valve & Mfg. Co.
Golden-Anderson Valve Specialty Co.
* Jenkins Bros.
* Kennedy Valve Mfg. Co.
Lunkenheimer Co.
* Nordberg Mfg. Co.
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(Reading Valve & Fittings (Div.)
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* Vogt, Henry Machine Co.

Valves, Thermostatically Operated
* Dean, Payne (Ltd.)
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* Roebling's, John A. Sons Co.

*Catalogue data of firms marded * appear in the A.S.M.E. Condensed Catalogues of Mechanical Equipment, 1924-25 Volume*

STEEL, HEAT TREATMENT OF

Hardening. The Hardening of Steel, W. Rosenhain. Iron & Steel Inst., Advance Paper no. 8, for Mtg. Sept. 1924, 17 pp., 9 figs. partly on supp. plate. Describes some of the outstanding phenomena connected with hardening and tempering of certain nonferrous alloys, in order to show analogy which exists between these phenomena and well-known behavior of iron-carbon alloys, and considers its applicability to particular case of steel.

High Speed Steel Tools. Effect of Heat Treatment on the Cutting Capacity of High-Speed Steels (Influence du traitement thermique sur la capacité de coupe des aciers rapides), H. Pommerenke and R. Dewert. Revue de Métallurgie, vol. 21, no. 7, July 1924, pp. 371–395, 134 figs. Gives results of tests to find simple, rapid, and inexpensive method of hardness testing, based on tests with Herbert machine, including micrographic examination of structure.

Heat Treating High Speed Steel Dies, G. C. Davis. Forging—Stamping—Heat Treating, vol. 10, no. 9, Sept. 1924, pp. 360–362, 3 figs. Description of heat-treating department at plant of Gray & Davis, Inc., Cambridge, Mass. Heat treatment of high-speed steel blanking dies that do not readily lend themselves to grinding after treatment offer many difficult problems.

Salt Baths. Salt Baths, S. Tour. Am. Soc. for Steel Treating—Trans., vol. 6, no. 2, Aug. 1924, pp. 171–186, 2 figs. Discusses reasons for employing liquid heating mediums; design of furnaces and containers for melting salt baths; gives tables of composition of salt mixtures, salt baths for carbon tool steels, alloy tool steels and high-speed steels, etc.

Spring Steel. Heat Treatment of Steel Springs, J. K. Wood. Am. Mach., vol. 61, no. 12, Sept. 18, 1924, pp. 443–446. Commercial considerations; general requirements for a spring; spring steels and their compositions; coiling, forming, and heat treating helical and leaf springs.

Tempering. Kinetics of Tempering Process in Steel (Zur Kinetik der Analssvorgänge im Stahl), W. Fraenkel and E. Heymann. Zeit. für anorganische u. allgemeine Chemie, vol. 134, nos. 2 and 3, Apr. 8, 1924, pp. 137–171, 8 figs. Experiments following temper reactions of carbon steel plunged into water by measuring resistance and density, showing that speed of tempering between 78 deg. and 360 deg. depends very much on temperature, etc.

Volume Changes. The Changes of Volume of Steels During Heat Treatment, L. Aitchison and G. R. Woodvine. Iron & Steel Inst., Advance Paper no. 1, for Mtg. Sept. 1924, 14 pp., 9 figs. Results of investigation to determine (1) whether lateral expansion and contraction of metal is equal to longitudinal, (2) whether any difference is produced in behavior of specimens cooled slowly in dilatometer as compared with those hardened in air outside instrument, and (3) effect of cooling steel from different temperatures.

STEEL, HIGH-SPEED

Forging and Tempering. Forging and Tempering High-Speed and Carbon Tool Steels. Ry. Rev., vol. 75, no. 8, Aug. 23, 1923, pp. 282–283. Tool standards of Atchison, Topeka & Santa Fe Ry. are maintained by instructions in regard to proper methods for various classes of work.

Nature of. On the Nature of High-Speed Steel, M. A. Grossmann and E. C. Bain. Iron & Steel Inst., Advance Paper no. 6, for Mtg. Sept. 1924, 24 pp., 23 figs. partly on supp. plates. Account of physical phenomena occurring in high-speed steel from time of casting homogeneous melt to production of hardened tools, so far as changes in nature, amounts, and distributions of well-known constituents of such steel are concerned.

STEEL MANUFACTURE

Blast-Furnace Process. Effect of Sulfur on Blast-furnace Process, T. L. Joseph. Am. Inst. Min. & Met. Engrs.—Trans., Advance Paper no. 1374-S, Sept. 1924, 11 pp., 3 figs. Points out distribution of this impurity in blast-furnace materials and indicates how its presence alters composition, quantity, and free-running or critical temperature of slag, and relation between these factors, fuel economy, and cost of iron. Pub. by permission of U. S. Bur. Mines.

STEEL WORKS

Cold-Drawing Plants. Operates New Cold Drawing Plant, J. D. Knox. Iron Trade Rev., vol. 75, no. 7, Aug. 14, 1924, pp. 423–427, 8 figs. Modern works of Anchor Drawn Steel Co., at Latrobe, Pa., 38 miles east of Pittsburgh. Various departments are laid out for straight-line production; primary annealing of coils is executed in gas-fired lead pots; description of cold-drawing process.

Electricity in. Electricity's Contribution to the Steel Industry, K. A. Pauly. Am. Inst. Elec. Engrs.—Jl., vol. 43, no. 9, Sept. 1924, pp. 831–839, 4 figs. Outline of processes involved in production of steel, followed by a discussion of characteristics of the various rolling mills and types of motors used to drive them. Considerations affecting choice of frequency. Author believes that greatest contribution of electricity to steel industry is providing of a means for economically using waste gases from blast furnaces. Points out importance, as a conservation measure, of utilization of blast-furnace gas and other sources of by-product power.

STOKERS

Lubrication of. Lubrication of the Automatic Stoker. Lubrication, vol. 10, no. 8, Aug. 1924, pp. 85–90, 11 figs. Discusses types of stokers, stoker drives, stoker lubrication and construction, design, and operating features involved.

Savings with Small Boilers. Mechanical Stoker Savings with Small Boilers, R. June. Power House, vol. 17, no. 16, Aug. 20, 1924, pp. 23–24, 2 figs. Reduction in cost of producing steam, increase in efficiency and availability of cheaper grades of fuel, among factors which prove installation economical.

SUPERHEATED STEAM

Research. Harvard Throttling Experiments Extned Data on Superheated Steam, P. W. Swain. Power, vol. 60, no. 9, Aug. 26, 1924, pp. 329–332, 4 figs. Work being done by Prof. Davis and Dr. Kleinschmidt at Harvard, where extremely accurate measurements are being made of Joule-Thomson effect.

SUPERHEATERS

Heat Exchange in. Heat Exchange in Steam Superheaters (Ueber den Wärmeaustausch in Dampfüberhitzern), C. Rühl. Wärme- u. Kälte-Technik, vol. 26, no. 14, July 22, 1924, pp. 115–118, 11 figs. Discusses heat transmission and describes patented pipe with interior partition having heat transmission of 1.2 times that of ordinary pipes.

T

TACHOMETERS

Kourkène. The Kourkène Tachometer (Le taéchomètre, système Kourkène). Génie Civil, vol. 85, no. 7, Aug. 16, 1924, pp. 154–157, 9 figs. Design and construction of direct reading apparatus made by Précision Moderne at Paris, measuring heights as well as distances.

Speed-Indicating-and-Recording. Speed Indicating and Recording. Shipbldg. & Shipg. Rec., vol. 24, no. 6, Aug. 7, 1924, p. 171, 2 figs. Description of electrical tachometer equipment.

TANKS

Horizontal, Chart for. A Quick and Useful Horizontal Tank Chart, W. F. Schaphorst. West. Machy. Wld., vol. 15, no. 7, July 1924, pp. 227–228, 1 fig. Chart gives gallons of liquid in any horizontal tank without use of tables, formulas, figures, or computations of any kind. Inversely chart may be used for determining length of tank necessary to hold given number of gallons where diameter of tank and depth of liquid are known.

TERMINALS, RAILWAY

Freight. Some Things Which the Erie Railroad is Doing. Ry. Rev., vol. 75, no. 12, Sept. 20, 1924, pp. 423–430, 14 figs. Discusses freight terminals of Erie Ry. in New York and Chicago districts, with special reference to certain recent extension of its less-than-carload facilities which afford service distinct from that offered by any other railroad. In New York facilities have been augmented by inland freight stations which are operated by trucking service which is also available to shipper as substitute for store-door delivery. In Chicago car-float service on Chicago River operates two freight stations in heart of important industrial districts.

TEXTILE INDUSTRY

France. Progress Made Since the War in French Textile Manufacture (Les progrès effectués depuis la guerre dans la construction textile Française), A. Renouard. Société d'Encouragement pour l'Industrie Nationale—Bul., vol. 136, no. 5, May 1924, pp. 426, 494, 41 figs. Discusses wool, combing, carding, spinning and other processes and products and machinery used; similarly cotton, hemp, silk, and the advance especially in textile machinery.

TEXTILE MACHINERY

British Empire Exhibition. The Machinery of the Cotton Mill at the British Empire Exhibition. Engineering, vol. 118, nos. 3053, 3055 and 3060, July 4, 18 and Aug. 22, 1924, pp. 11–13, 89–91 and 247–251, 34 figs. partly on supp. plates. Also Engineer, vol. 138, no. 3582, Aug. 22, 1924, pp. 202–207, 28 figs. partly on pp. 208 and 212. Descriptions of textile machinery exhibited, including gins, bale breakers and openers, feeding machines, carding engines, drawing frames, spinning machines, weaving machines, folding and measuring machines, etc.

The Textile Industry Exhibit at Wembley. Electrician, vol. 93, no. 2413, Aug. 15, 1924, pp. 176–177, 3 figs. Describes electrical equipment of cotton machinery.

TIME STUDY

Bicycle Assembling. Time Study and Belt Conveying (Zeitstudien und Bandarbeit), E. Sachsenberg. Maschinenbau, vol. 3, no. 13, Apr. 10, 1924, pp. 433–439, 22 figs. Discusses connection between time study and synchronized conveying and gives example of assembling bicycles in 118 operations with aid of belt conveyor.

TIRES, RUBBER

Balloon. Dunlop Cord Balloon Tyres. Auto-Motor Jl., vol. 29, no. 35, Aug. 28, 1924, p. 722, 1 fig. Describes new Dunlop balloon tire; shows how wired edge of cover at one part of rim is depressed into well in center of rim, allowing edge of cover to be lifted over rim edge at opposite diameter.

Non-Skid. Two Notable Tyre Developments. Motor Transport (Lond.), vol. 39, no. 1017, Aug. 25, 1924, pp. 243–244, 6 figs. Low-pressure pneumatic and new design of solid tire that show phenomenal non-skid capacity.

TRACTORS

German. German Power Tractors for Agricultural Purposes, G. Fischer. Eng. Progress, vol. 5, no. 8, Aug. 1924, pp. 141–147, 14 figs. Discusses small motor plows, traveling speed, grippers for motor plows, tractor plows, and fuels for power plows.

TUBES

Brass, Internal Stress Measurement. A Method for Measuring Internal Stress in Brass Tubes, R. J. Anderson and E. G. Fahlman. Inst. of Metals, Advance Paper no. 1, for Mtg. Sept. 8–11, 1924, 13 pp., 7 figs. partly on supp. plates. Nature of stress in drawn tubing. Strip method, developed by authors, for measurement of stress in drawn tubes.

V

VENTILATION

Problems. Some Aspects of the Ventilation Problem, R. Grierson. Domestic Eng. (Lond.), vol. 34, no. 7, July 1924, pp. 146–153. Experiments show that rate of heat emission varies with state of physical rest or work and with age and sex of person under test; deals with all scientific and physiological aspects of ventilation and considers matters affecting design of plant.

VIBRATIONS

Recording. A New Process for Recording Small Vibrations (Ueber ein neues Verfahren zur Registrierung kleiner Schwingungen), G. Schmaltz. Maschinenbau, vol. 3, no. 18, June 26, 1924, pp. 639–641, 7 figs. Describes highly sensitive apparatus for recording small vibrations and gives examples of application; can be fixed to any part of machine.

VISCOSIMETERS

Gallo. A New Type of Viscosimeter (Un nuovo tipo di viscosimetro), G. Gallo and M. Tenani. Giornale di Chimica Industriale ed Applicata, vol. 6, no. 6, June 1924, pp. 280–283, 2 figs. Describes viscosimeter consisting of two parallel metal disks, very close together, rotating on same axis at different speeds, immersed in oil to be tested; develops formulas for calculation.

W

WASTE HEAT

Utilization. Economic Considerations in the Design of Waste-Heat Plants (Wirtschaftlichkeitsbetrachtungen bei der Bemessung von Abhitzeverwertungsanlagen), A. Konejung. Wärme, vol. 47, no. 30, July 25, 1924, pp. 345–348, 8 figs. Develops formulas and makes calculations for determining most suitable end temperature of heat-exchanging liquids and their velocity.

Possibility and Advantages of Coupling Power and Heat in Public and Industrial Plants (Möglichkeiten und Vorteile der Kraft-Wärmekupplung in öffentlichen und industriellen Betrieben), C. Nerger. Glückauf, vol. 60, no. 34, Aug. 23, 1924, pp. 735–741, 6 figs. Starting from drawbacks of steam operation with condensation for power production, recommends connecting heat-consuming plants with power plants in such a way that exhaust steam may be used for heating and other purposes.

WATER POWER

Canada. Water Power Development in Canada, J. B. Challies. Can. Engr. vol. 47, no. 8, Aug. 19, 1924, pp. 257–263, 3 figs. Also Engineering, vol. 118, no. 3061, Aug. 29, 1924, pp. 301–302. Outline of extent, utilization, and administration of water powers in Canada. Abstract of paper read before British Assn. for Advancement of Science.

WATER TREATMENT

Railways. How the Chemical Engineer Tackles the Water Problems of a Railroad, W. M. Barr. Chem. & Met. Eng., vol. 31, no. 9, Sept. 1, 1924, pp. 348–351, 6 figs. Points out some of the many problems of water supply on a railroad and emphasizes necessity of solving them with aid of a chemical engineer rather than a laboratory chemist. Elimination of scale-forming solids and simultaneous production of non-foaming water all over a railroad system is a major technical problem.

WELDING

Equipment. Welding Equipment in Service. Can. Machy., vol. 32, no. 8, Aug. 21, 1924, pp. 26–27 and 46–47, 1 fig. Describes proper methods for setting up tank outfit, crank open valves, averting trouble, release adjusting screws, regulators carefully made, diconnecting equipment, etc.

Oxy-Acetylene. See OXY-ACETYLENE WELDING.

WIRE

Steel. Tensile Properties of Some Steel Wires at Liquid Air Temperatures, W. P. Sykes. Am. Soc. for Steel Treating—Trans., vol. 6, no. 2, Aug. 1924, pp. 138–144, 2 figs. Compares tensile properties of low-carbon, nickel, and chrome-molybdenum steels at room temperature and that of liquid air (—180 deg. cent.).

WIRE DRAWING

Effect on Steel Properties. Wire Drawing and Properties of the Steel, G. F. Comstock. Iron Age, vol. 114, nos. 11 and 12, Sept. 11 and 18, 1924, pp. 621–624, and 705–707, 24 figs. Some of the changes due to progressive cold drawing. Static and structural effects. Analogy with copper. Changes due to progressive drawing traced by photomicrographic analysis. Study of grain size.

Alphabetical List of Advertisers

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	*Morse Chain Co.	90
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	New York Blue Print Paper Co.	125
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Q	*Quigley Furnace Specialties Co.	40
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	*Sarco Co. (Inc.)	55
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	*Schutte & Koerting Co.	63
	*Scovill Mfg. Co.	45
	Sesure Water Gauge Co.	28
	*Shepard Elec. Crane & Hoist Co.	105
	*Simplex Valve & Meter Co.	71
	*Skinner Engine Co.	11
	*Smidth, F. L. & Co.	77
	*Smith, H. B. Co.	123
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	*Smooth-On Mfg. Co.	62
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	Squires, C. E. Co.	55
	Steere Engineering Co.	58
	*Strom Ball Bearing Mfg. Co.	99
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	*Superheater Co.	Outside Back Cover
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	*Tagliabue, C. J. Mfg. Co.	—
	*Terry Steam Turbine Co.	2
	*Timken Roller Bearing Co.	93
	*Titusville Iron Works Co.	20
	Tolhurst Machine Works	112
	*Troy Engine & Machine Co.	8
U	Union Chain & Mfg. Co.	89
	Union Drawn Steel Co.	—
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*Catalogue data of firms marked * appear in the A.S.M.E. Condensed Catalogues of Mechanical Equipment, 1924-25 Volume*

THE ENGINEERING INDEX

(Registered United States, Great Britain and Canada)

THE ENGINEERING INDEX presents each month, in conveniently classified form, items descriptive of the articles appearing in the current issues of the world's engineering and scientific press of particular interest to mechanical engineers. At the end of the year the monthly installments are combined along with items dealing with civil, electrical, mining and other branches of engineering, and published in book form, this annual volume having regularly appeared since 1906. In the preparation of the Index by the engineering staff of The American Society of Mechanical Engineers some 1200 technical publications received by the Engineering Societies Library (New York) are regularly reviewed, thus bringing the great resources of that library to the entire engineering profession.

Photoprint copies (white printing on a black background) of any of the articles listed in the Index may be obtained at a price of 25 cents a page. When ordering photoprints identify the article by quoting from the Index item: (1) Title of article; (2) Name of periodical in which it appeared; (3) Volume, number, and date of publication of periodical; (4) Page numbers. A remittance of 25 cents a page should accompany the order. Orders should be sent to the Engineering Societies Library, 29 West 39th Street, New York.

(See also page 938 of this issue for supplementary items.)

ABRASIVE WHEELS

Manufacture of. Making Vitrified Abrasive Wheels. Chem. & Met. Eng., vol. 31, no. 14, Oct. 6, 1924, pp. 531–533, 6 figs. Describes some of the problems in production of abrasive wheels from carborundum grains.

Surface Grinding in Stone Work (Der Flächenschliff in der Gesteinsbearbeitung), C. Krug. Tonindustrie-Zeitung, vol. 48, no. 73, Sept. 10, 1924, pp. 791–795, 14 figs. A series of articles on grinding wheels, grain and hardness, production, evaluation of abrasives, grinding in grinding machines, safety regulations, roller grinding machines, natural and artificial abrasives, etc.

AERONAUTICS

Theory of Flow. Session on Flying of the VDI General Meeting (Tagung über Luftfahrt gelegentlich der Hauptversammlung des VDI, Hannover). Zeit. des Vereines deutscher Ingenieure, vol. 68, no. 36, Sept. 6, 1924, pp. 926–928, 6 figs. Series of papers discussing progress in theory of flow and calculations of flow round asymmetric bodies, wing forms; theory of bearing wings or theory of circulation; light-weight construction.

AIR CONDITIONING

Humidifying Plants. Air-Conditioning Plant in Textile Works. Sulzer Tech. Rev., no. 2, 1924, pp. 8–14, 8 figs. Describes Sulzer system of air-humidifying plants.

AIR PUMPS

Piston. Piston Air Pumps (Die Kolbenluftpumpen). Fördertechnik u. Frachtverkehr, vol. 17, Sept. 3, 1924, pp. 232–234, 8 figs. Construction of valve and slide-valve pumps, pipe lines and parts.

AIRPLANE ENGINES

Air-Cooled. Air-Cooled Airplane Engines (Luftgekühlte Flugmotoren), E. Gosslau. Zeit. des Vereines deutscher Ingenieure, vol. 68, no. 36, Sept. 6, 1924, pp. 921–925, 15 figs. Details of some 50 engines; limiting number of cylinders; diameters of cylinders and engine capacity; saving weight by eliminating water cooling; fuel and oil consumption; increase of performance by higher compression and r.p.m., etc.

Condor. The Rolls-Royce "Condor," Series III. Flight, vol. 16, no. 32, Aug. 7, 1924, pp. 444–450, 20 figs. Engine is of 12-cylinder water-cooled "vee" type, with cylinder banks placed at angle of 60 deg.; bore, 5½ in.; stroke, 7½ in.; normal b.hp., 650; maximum speed (crankshaft), 2100 r.p.m.

Details. New Aeronautical Engines (Les nouveaux moteurs d'aviation), J.-A. Lefranc. Nature (Paris), no. 2631, Sept. 6, 1924, pp. 147–157, 10 figs. Details of recent engines, including 400-hp. Bristol-Jupiter, 450-hp. Panhard, 600-hp. Farman, and others.

Power Measurements, Correction of. Correcting Horsepower Measurements to a Standard Temperature, S. W. Sparrow. Nat. Advisory Committee for Aeronautics—Report, no. 190, 1924, 14 pp., 16 figs. Discusses relation between temperature of air at entrance to carburetor and power developed by engine; consideration of range of temperatures likely to result from changes of season, locality, or altitude.

Supercharging. Airplane Turbo-Supercharger Development in the United States, D. Gregg. Soc. Automotive Engrs.—Jl., vol. 14, no. 5, May 1924, pp. 532–538, 17 figs. Supercharger types; supercharger operation; air cooler and fuel system; propeller types; oxygen-supply system; heating apparatus; sea-level pressure at great altitude; usefulness of turbo-supercharger.

AIRPLANE PROPELLERS

Airfoil Theory and. Comparison of Model Propeller Tests with Airfoil Theory, Wm. F. Durand and E. P. Lesley. Nat. Advisory Committee for Aeronautics—Report, no. 196, 1924, 26 pp., 61 figs. Examination of degree of approach which may be anticipated between laboratory tests on model airplane propellers and results computed by airfoil theory, based on tests of airfoils representative of successive blade sections.

Micarta. Micarta Propellers, F. W. Caldwell and N. S. Clay. Nat. Advisory Committee for Aeronautics—Tech. Notes, nos. 198, 199, 200 and 201, Aug. and Sept. 1924. Pamphlet No. 198, 9 pp., 4 figs.: Materials. No. 199, 10 pp., 7 figs. partly on supp. plates: Method of construction. No. 200, 13 pp., 11 figs. partly on supp. plates: General description of design. No. 201, 17 pp., 15 figs.: Technical methods of design.

AIRPLANES

Cubaroo. The Blackburn-Napier "Cubaroo" Aeroplane. Automobile Engr., vol. 14, no. 193, Sept., 1924, p. 274, 2 figs. "Cubaroo," in which Napier engine is fitted, is a three-seater torpedo-carrying plane; span, 88 ft.; length, 54 ft.; overall height, 19 ft.

Flying Boats. See FLYING BOATS.

Performance Predetermination. The Logarithmic Polar Curve—Its Theory and Application to the Predetermination of Airplane Performance, V. Cronstedt. Nat. Advisory Committee for Aeronautics—Tech. Notes, no. 205, Oct. 1924, 34 pp., 14 figs. Outlines theory and shows some of possibilities of Rith method, generally known as logarithmic polar curve for predetermination of airplane performance, and also shows modifications required by more recent conceptions of performance.

Pilotless. Latest Progress in Telemechanics. Pilotless Airplanes. (Les derniers progrès de la télémécanique. L'avion sans pilote.), E. Marcotte. Arts et Métiers, vol. 77, no. 45, June 1924, pp. 201–204. Discusses progress in distance control by means of Hertzian waves, Sperry stabilizers, pilotless mail carriers, etc.

Racers. Dayton Air Meet Shows Marked Progress in Civil and Commercial Flying, L. S. Gillette. Automotive Industries, vol. 51, no. 15, Oct. 9, 1924, pp. 636–639, 6 figs. Account of races and participating machines.

AIRSHIPS

Mooring at Sea. Mooring Dirigibles at Sea. Flight, vol. no. 37, Sept. 11, 1924, pp. 562–563, 2 figs. Describes experiments of anchoring rigid airship to mobile mast; "Shenandoah" was moored to "Patoka" lying in Narragansett Bay.

ALLOYS

Aluminum. See ALUMINUM ALLOYS.

Lead. See LEAD ALLOYS.

Monel Metal. See MONEL METAL.

ALUMINUM

Analysis. Aluminum in Alloys, D. H. Brophy. Indus. & Eng. Chem., vol. 16, no. 9, Sept., 1924, p. 963. Simple and rapid method for analysis of aluminum.

Production. Aluminum, Its Production and Use (Aluminium, seine Erzeugung und Verwendung), K. Arndt. Elektrotechnische Zeit., special no., Aug. 28, 1924, pp. 2–6, 8 figs. Discusses history of aluminum, processes of production from bauxite, electrolysis of cryolite-alumina, aluminum alloys, etc.

Uses. Aluminum and Its Applications (L'Aluminium et ses applications), M. L. Guillet. Société Industrielle de Mulhouse—Bul., vol. 90, no. 6, June-Aug., 1924, pp. 454–470. Discusses method of manufacture from bauxite, properties and impurities of aluminum, its uses and alloys; duraluminum; alpax.

Use of Aluminum in Electrical Industries (Verwendung von Aluminium in der Elektrotechnik), W. Wunder. Elektrotechnische Zeit., special no., Aug. 28, 1924, pp. 9–10, 5 figs. Discusses application of aluminum and aluminum alloys in motors, dynamos, transformers, cables, etc.

ALUMINUM ALLOYS

Aluminum-Copper-Tellurium. Properties and Structure of Some Alloys of Aluminum-Copper-Tellurium, F. T. Sisco and M. R. Whitmore. Indus. & Eng. Chem., vol. 16, no. 8, Aug. 1924, pp. 838–841, 11 figs. Result of exploratory investigation on alloys of aluminum containing 5 per cent copper to which tellurium has been added in amounts from 0.25 to 5 per cent; physical properties of these alloys, and effect of tellurium on microstructure of aluminum; method of analysis for alloys.

Aluminum-Silicon. The New Aluminum-Silicon Alloys, J. D. Edwards and R. S. Archer. Chem. & Met. Eng., vol. 31, no. 13, Sept. 29, 1924, pp. 504–508, 8 figs. Pacz' process of "modification" and remarkable improvement in properties it brings about.

Duralumin. See DURALUMIN.

APPRENTICES, TRAINING OF

Foundry. Recent Developments in Foundry Education and Training in France, J. G. Pearce. Foundry Trade Jl., vol. 30, no. 422, Sept. 18, 1924, pp. 248–249. Particulars regarding scheme recently put into operation by French Foundry Employers' Assn. to encourage entry of suitable youths to foundries by providing systematic apprenticeship and training courses for all, and means whereby any young man of capacity and intelligence may obtain knowledge and experience necessary to fit him for any position in the industry to which he may be promoted. Extracted from Bul. of Brit. Cast Iron Research Assn.

Solves Training of Apprentices. Iron Trade Rev., vol. 75, no. 16, Oct. 16, 1924, pp. 1018–1022, 6 figs. Wisconsin law requiring employed persons under 18 to spend one-half day each week in some school has enabled many workers to obtain trade training; foundry practice popular.

Wisconsin Solves Apprentice Puzzle. Foundry, vol. 52, no. 19, Oct. 1, 1924, pp. 752–757, 5 figs. Describes plan, successful over a number of years trial, evolved by state of Wisconsin, its industrial leaders, its educators and its great army of workmen. Outline of how plan works at plant of Falk Corp.

Railways. Apprenticeship Methods on the Santa Fe. Ry. Mech. Engr., vol. 98, nos. 6, 7, 8 and 9, June, July, Aug. and Sept., 1924, pp. 355–359, 415–418, 467–472 and 527–531, 28 figs. Description of apprenticeship methods followed on Atchison, Topeka & Santa Fe. How and why work was started; selection of apprentices; equipment; instructions given in shop schools, methods and schedule of shop work followed in the various departments of shops, tools furnished, qualifications of instructors and source of

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NOTE.—The abbreviations used in indexing are as follows:

Academy (Acad.)
American (Am.)
Associated (Assoc.)
Association (Assn.)
Bulletin (Bul.)
Bureau (Bur.)
Canadian (Can.)
Chemical or Chemistry (Chem.)
Electrical or Electric (Elec.)
Electrician (Elecn.)
Engineer[s] (Engr.[s])
Engineering (Eng.)
Gazette (Gaz.)
General (Gen.)
Geological (Geol.)
Heating (Heat.)
Industrial (Indus.)
Institute (Inst.)
Institution (Instn.)
International (Int.)
Journal (Jl.)
London (Lond.)
Machinery (Machy.)
Machinist (Mach.)
Magazine (Mag.)
Marine (Mar.)
Materials (Matls.)
Mechanical (Mech.)
Metallurgical (Met.)
Mining (Min.)
Municipal (Mun.)
National (Nat.)
New England (N. E.)
Proceedings (Proc.)
Record (Rec.)
Refrigerating (Refrig.)
Review (Rev.)
Railway (Ry.)
Scientific or Science (Sci.)
Society (Soc.)
State names (Ill., Minn., etc.)
Supplement (Supp.)
Transactions (Trans.)
United States (U. S.)
Ventilating (Vent.)
Western (West.)

Classified List of Mechanical Equipment

Manufactured by Firms Represented in MECHANICAL ENGINEERING

FOR ALPHABETICAL LIST OF ADVERTISERS, SEE PAGE 194

Accumulators, Hydraulic
* Farrel Foundry & Machine Co.
Mackintosh-Hemphill Co.
* Worthington Pump & Mchry. Corp'n.

Aftercoolers, Air
* Ingersoll-Rand Co.

Agitators
Hill Clutch Machine & Fdry. Co.

Air Compressors, Receivers, etc.
(See Compressors, Receivers, etc., Air)

Air Conditioning Apparatus
* American Blower Co.
* Carrier Engineering Corp'n
* Clarage Fan Co.
Sturtevant, B. F. Co.

Air-Jet Lifts
* Schutte & Koerting Co.

Air Washers
* American Blower Co.
* Carrier Engineering Corp'n
* Clarage Fan Co.
* Cooling Tower Co. (Inc.)
Sturtevant, B. F. Co.

Alloys
Driver-Harris Co.

Ammeters
* Bristol Co.
* General Electric Co.
* Westinghouse Electric & Mfg. Co.

Anemometers
* Taylor Instrument Cos.
Weber, F. Co. (Inc.)

Annealing
* American Metal Treatment Co.
* Nuttall, R. D. Co.

Arc Welding Equipment
* Westinghouse Electric & Mfg. Co.

Arches, Boiler Furnace
* McLeod & Henry Co.
* Titusville Iron Works Co.

Arches, Fire Door
* McLeod & Henry Co.

Arches, Ignition (Flat Suspended)
* Combustion Engineering Corp'n
* McLeod & Henry Co.

Asbestos Products
Carey, Philip Co.
* Garlock Packing Co.
Johns-Manville (Inc.)

Ash Lifts, Telescopic
* Gillis & Geoghegan
* Palmer-Bee Co.

Autoclaves
* Farrel Foundry & Machine Co.

Babbitt Metal
* Medart Co.
* Westinghouse Electric & Mfg. Co.

Balancing Machines, Dynamic
* Olsen, Tinius Testing Machine Co.

Balls, All Metals (Hollow Seamless)
* Hollow Ball Co., (Inc.)

Ball Bearings, Gages, etc.
(See Bearings, Gages, Ball)

Balls, Brass and Bronze
* Atlas Ball Co.
* Gwilliam Co.

Balls, Steel
* Atlas Ball Co.
* Gwilliam Co.
* New Departure Mfg. Co.
* S K F Industries (Inc.)
Standard Steel & Bearings (Inc.)

Barometers
* American Schaeffer & Budenberg Corp'n
* Taylor Instrument Cos.

Barometers, Mercurial
* Tagliabue, C. J. Mfg. Co.

Bearings, Ball
* Fafnir Bearing Co.
* Gwilliam Co.
* Marlin-Rockwell Corp'n
* New Departure Mfg. Co.
* Norma - Hoffmann Bearings Corp'n
* S K F Industries (Inc.)
Standard Steel & Bearings (Inc.)
* Strom Ball Bearing Mfg. Co.

Bearings, Collar Oiling
Hill Clutch Machine & Foundry Co.

Bearings, Radial Thrust
* New Departure Mfg. Co.

Bearings, Roller
* Gwilliam Co.
* Hyatt Roller Bearing Co.
* Norma - Hoffmann Bearings Corp'n
* Royersford Fdry. & Mach. Co.
* Timken Roller Bearing Co.

Bearings, Self-Oiling
* Brown, A. & F. Co.
* Doehler Die-Casting Co.
* Falls Clutch & Machinery Co.
Hill Clutch Machine & Fdry. Co.
* Jones, W. A. Fdry. & Mach. Co.
Link-Belt Co.
* Royersford Fdry. & Mach. Co.
Wood's, T. B. Sons Co.

Bearings, Tapered
* Timken Roller Bearing Co.

Bearings, Thrust
* Fafnir Bearing Co.
* General Electric Co.
* Gwilliam Co.
Hill Clutch Machine & Fdry. Co.
* Norma - Hoffmann Bearings Corp'n
* S K F Industries (Inc.)
* Strom Ball Bearing Mfg. Co.
* Timken Roller Bearing Co.

Belt Dressing
* Dixon, Joseph Crucible Co.
Gandy Belting Co.

Belt Lacing, Steel
* Bristol Co.

Belt Tighteners
* Brown, A. & F. Co.
Hill Clutch Machine & Fdry. Co.
* Jones, W. A. Fdry. & Mach. Co.
Link-Belt Co.
* Medart Co.
* Smidth, F. L. & Co.
Wood's, T. B. Sons Co.

Belt Tighteners, Automatic
Hill Clutch Machine & Fdry. Co.

Belting, Canvas (Stitched)
Gandy Belting Co.
* United States Rubber Co.

Belting, Conveyor
Gandy Belting Co.
* Goodrich, B. F. Rubber Co.
Sandvik Steel (Inc.)
* United States Rubber Co.

Belting, Elevator
Gandy Belting Co.
* Goodrich, B. F. Rubber Co.
* United States Rubber Co.

Belting, Endless
Gandy Belting Co.

Belting, Fabric
Gandy Belting Co.

Belting, Rubber
* Goodrich, B. F. Rubber Co.
* United States Rubber Co.

Belting, Waterproof
Gandy Belting Co.

Bending & Straightening Machines
* Long & Allstatter Co.

Bends, Pipe
* Frick Co. (Inc.)
* Vogt, Henry Machine Co.

Billets, Steel
* Timken Roller Bearing Co.

Blocks, Tackle
Clyde Iron Work Sales Co.
* Roebling's, John A. Sons Co.

Blowers, Centrifugal
* American Blower Co.
* Clarage Fan Co.
* Coppus Engineering Corp'n
* De Laval Steam Turbine Co.
* General Electric Co.
* Ingersoll-Rand Co.
Kerr Turbine Co.
Sturtevant, B. F. Co.
* Westinghouse Electric & Mfg. Co.

Blowers, Fan
* American Blower Co.
* Clarage Fan Co.
* Coppus Engineering Corp'n
* Green Fuel Economizer Co.
Sturtevant, B. F. Co.

Blowers, Forge
* American Blower Co.
Sturtevant, B. F. Co.

Blowers, Pressure
* American Blower Co.
* Clarage Fan Co.
Lammert & Mann Co.
Sturtevant, B. F. Co.

Blowers, Rotary
Lammert & Mann Co.
* Schutte & Koerting Co.
Sturtevant, B. F. Co.

Blowers, Soot
Diamond Power Specialty Corp'n
Sturtevant, B. F. Co.

Blowers, Steam Jet
* Schutte & Koerting Co.

Blowers, Turbine
* Coppus Engineering Corp'n
Sturtevant, B. F. Co.

Blueing (Metal)
* American Metal Treatment Co.

Boards, Drawing
Dietzgen, Eugene Co.
Keuffel & Esser Co.
New York Blue Print Paper Co.
U. S. Blue Co.
Weber, F. Co. (Inc.)

Boiler Baffles
* King Refractories Co. (Inc.)
* McLeod & Henry Co.

Boiler Compounds
* Dixon, Joseph Crucible Co.
Unisol Mfg. Co.

Boiler Coverings, Furnaces, Tube Cleaners, etc.
(See Coverings, Furnaces, Tube Cleaners, etc., Boiler)

Boiler Fronts
* O'Brien, John Boiler Works Co.
* Titusville Iron Works Co.

Boiler Settings, Steel Cased
* Casey-Hedges Co.
* McLeod & Henry Co.
* O'Brien, John Boiler Works Co.
* Vogt, Henry Machine Co.
* Walsh & Weidner Boiler Co.

Boilers, Heating
* Casey-Hedges Co.
* Erie City Iron Works
* Keeler, E. Co.
* Leffel, James & Co.
Lidgerwood Mfg. Co.
* O'Brien, John Boiler Works Co.
* Titusville Iron Works Co.
* Union Iron Works
* Walsh & Weidner Boiler Co.

Boilers, Locomotive
* Casey-Hedges Co.
* Keeler, E. Co.
* Leffel, James & Co.
* Titusville Iron Works Co.
* Union Iron Works
* Walsh & Weidner Boiler Co.

Boilers, Marine (Scotch)
Bethlehem Shipbldg.Corp'n(Ltd.)
* Casey-Hedges Co.
* Leffel, James & Co.
* Titusville Iron Works Co.
* Walsh & Weidner Boiler Co.

Boilers, Marine (Water Tube)
* Babcock & Wilcox Co.
Bethlehem Shipbldg.Corp'n(Ltd.)
* Casey-Hedges Co.
* Connelly, D. Boiler Co.
* O'Brien John Boiler Works Co.
* Erie City Iron Works
* Keeler, E. Co.
* Leffel, James & Co.
Lidgerwood Mfg. Co.
Morrison Boiler Co.
* O'Brien, John Boiler Works Co.
* Titusville Iron Works Co.
* Union Iron Works
* Vogt, Henry Machine Co.
* Walsh & Weidner Boiler Co.
* Webster, Howard J.
* Wickes Boiler Co.

Boilers, Tubular (Vertical Fire)
* Bigelow Co.
* Casey-Hedges Co.
Clyde Iron Works Sales Co.
* Keeler, E. Co.
* Leffel, James & Co.
Lidgerwood Mfg. Co.
Morrison Boiler Co.
* O'Brien, John Boiler Works Co.
* Titusville Iron Works Co.
* Union Iron Works
* Walsh & Weidner Boiler Co.

Boilers, Water Tube (Horizontal)
* Babcock & Wilcox Co.
Bethlehem Shipbldg.Corp'n(Ltd.)
* Casey-Hedges Co.
* Cole, R. D. Mfg. Co.
* Connelly, D. Boiler Co.
* Edge Moor Iron Co.
* Erie City Iron Works
* Keeler, E. Co.
* Ladd, George T. Co.
Morrison Boiler Co.
* O'Brien, John Boiler Works Co.
* Springfield Boiler Co.
* Union Iron Works
* Vogt, Henry Machine Co.
* Walsh & Weidner Boiler Co.
* Wickes Boiler Co.

Boilers, Water Tube (Inclined)
* Babcock & Wilcox Co.
Bethlehem Shipbldg.Corp'n(Ltd.)
* Bigelow Co.
* Casey-Hedges Co.
* Keeler, E. Co.
* Ladd, George T. Co.
Morrison Boiler Co.
* O'Brien, John Boiler Works Co.
* Vogt, Henry Machine Co.
* Walsh & Weidner Boiler Co.

Boilers, Water Tube (Vertical)
* Babock & Wilcox Co.
* Bigelow Co.
* Casey-Hedges Co.
* Erie City Iron Works
* Keeler, E. Co.
* Ladd, George T. Co.
Morrison Boiler Co.
* O'Brien, John Boiler Works Co.
* Walsh & Weidner Boiler Co.
* Wickes Boiler Co.

Boring and Drilling Machines
Universal Boring Machine Co.

Boring, Drilling and Milling Machines (Horizontally Combined)
Universal Boring Machine Co.

Boxes, Carbonizing
Driver-Harris Co.

Boxes, Case Hardening
Driver-Harris Co.

Brake Blocks
Johns-Manville (Inc.)
* Springfield Boiler Co.
* Titusville Iron Works Co.
* Walsh & Weidner Boiler Co.

Boilers, Portable
* Casey-Hedges Co.
* Erie City Iron Works
* Frick Co. (Inc.)
* Keeler, E. Co.
* Leffel, James & Co.
Lidgerwood Mfg. Co.
* O'Brien, John Boiler Works Co.
* Titusville Iron Works Co.
* Union Iron Works
* Walsh & Weidner Boiler Co.

Boilers, Tubular (Horizontal Return)
* Bigelow Co.
* Casey-Hedges Co.
* Cole, R. D. Mfg. Co.
* Connelly, D. Boiler Co.

Brakes, Air
* Allis-Chalmers Mfg. Co.
* General Electric Co.

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their supply, records maintained regarding work and qualifications of each apprentice, apprentice boards, intructors' conventions, moral training and discipline of apprentices, apprentice clubs, special apprentices, apprentice graduates, etc. Direct and indirect results derived from this apprentice training system.

AUTOMOBILE ENGINES

Balancing. Engine Balancing Calculations, M. Platt. Automobile Engr., vol. 14, nos. 192 and 193, Aug. and Sept. 1924, pp. 243–249 and 275–281, 42 figs. Discusses balance of rotating masses; crankshafts; engine-balancing calculations. Appendices. Bibliography.

Practical Balancing of Engine Components, A. A. Bull. Soc. Automotive Engrs.—Jl., vol. 14, no. 5, May 1924, pp. 527–531, 9 figs. Discusses vibrations that may either be felt or heard in car and which are a result of lack of balance. From a production standpoint, influence of mechanical unbalance of parts and variation in their weight that may create different unbalanced forces are of principal concern; illustrates and analyzes specific instances. Commercial balancing of crankshafts, flywheels, clutches and propeller-shaft assemblies. Considers six and eight-cylinder engine balance, and gives vibration-test results, in terms of actual measurement on dynamometer and in car.

Construction. Special Problems in the Construction of Medium- and High-Pressure Automobile Engines (Sonderaufgaben beim Bau von Mittel- und Hochdruck-Kraftfahrzeugmotoren?, F. E. Bielefeld. Wirtschaftsmotor, vol. 6, no. 7–8, Aug. 25, 1924, pp. 9–12, 7 figs. Discusses question of weight, least weight without reducing safety and life; high number of revolutions; further development of two-stroke engine.

Fuels and Oils, Effects of. Laboratory Tests Show Effects of Different Fuels and Oils on Engine Performance. Automotive Industries, vol. 51, no. 14, Oct. 2, 1924, pp. 608–610, 3 figs. Dynamometer laboratory of The Texas Co. in Long Island City given over to research on performance and engine wear. Nature and arrangement of testing equipment.

AUTOMOBILE FUELS

Anti-knock Compounds. A Suggested Mechanism for Antiknock Action, G. L. Wendt and F. V. Grimm. Indus. & Eng. Chem., vol. 16, no. 9, Sept. 1924, pp. 890–893, 1 fig. Experiments show that tetraethyl lead and other anti-knock compounds actually have marked effect in recombining gaseous ions at ordinary pressures and temperatures while knock inducers similarly tested have no effect.

Gasoline. See GASOLINE.

Tetralin. Tetralin, Fred. Nathan. Fuel, vol. 3, no. 10, Oct. 1924, pp. 346–349. Its history, manufacture and use as fuel for internal-combustion engines; produced by process of hydrogenating naphthalene.

AUTOMOBILE MANUFACTURING PLANTS

Fiat, Italy. The Impressive Story of Fiat, J. A. Lucas and F. E. Bardrof. Am. Mach., vol. 60, nos. 17, 18, 19, 21 and 25, and vol. 61, nos. 1, 2, 4, 6 and 8, Apr. 24, May 1, 8, 22, June 19, July 3, 10, 24, Aug. 7 and 21, 1924, pp. 603–607, 10 figs.; 655–659 and 693–696, 31 figs.; 763–767, 10 figs.; 927–931, 15 figs.; 1–4, 14 figs.; 49–53, 20 figs.; 157–160, 11 figs.; 223–225, 10 figs.; 295–296, 8 figs.; Apr. 24: Plants and products of large automobile company in Turin, Italy. May 1 and 8: Manufacture of ball bearings. May 22: Lingotto automobile plant; shop arrangement and management; apprenticeship system. June 19: Raw-material handling at Lingotto plant; forging and stamping departments; molding and machining operations in foundry. July 3: Methods employed in machining pistons for Fiat motor. July 10: Methods and tools used in making connecting rods. July 24: Methods employed in machining 4-cylinder block at Lingotto plant. Aug. 7: Machining methods for upper section of crankcase. Aug. 21: Final operations on crankcase.

AUTOMOBILES

Alvis. The Alvis Car. Auto-Motor Jl., vol. 29, no. 37, Sept. 11, 1924, pp. 765–768, 12 figs. Gives technical details; monobloc engine is mounted in chassis on sub-frame of pressed steel, camshaft is carried in three large-diameter bearings and driven by timing gear wheels of hard phosphor bronze; overhead-valve engine; plungers are spring-pressed and lower ends of push-rods descend into them.

Bodies, Manufacture of. Automobile Body Engineering, W. F. Brown. Automotive Mfr., vol. 66, nos. 3 and 4, June and July 1924, pp. 12–14 and 13–15. Describes strength, lines and general outline, vertical stresses, frame and window framing, quarters and roof, longitudinal stresses, body iron work, panel work, aluminum moldings and general use of light-weight metals, body framework, reducing weight and standards of weight.

Bumpers. Motor-Car Bumpers, J. R. Reyburn. Soc. Automotive Engrs.—Jl., vol. 15, no. 4, Oct. 1924, pp. 359–362, 9 figs. Characteristics of early bumpers; designing most protective bumper; importance of easy application; etc.

Electrical Equipment. New Electrical Equipment Line Designed for Higher Priced Cars, P. M. Heldt. Automotive Industries, vol. 51, no. 7, Aug. 14, 1924, pp. 326–329, 4 figs. Details of electrical equipment for automobiles, manufactured by De Jon Elec. Corp. of Poughkeepsie, N. Y. Generators and starting motors made with 4½, 5 and 5½ in. frame diameters; head at commutator end is an aluminum casting; third-brush control and magnetic cutout employed; closed-circuit ignition system comprises interrupter, distributor, and coil.

Garages. See GARAGES.

Headlights. Desirable Road-Illumination, C. A. Michel. Soc. Automotive Engrs.—Jl., vol. 14, no. 5, May 1924, pp. 511–515, 10 figs. Laboratory approval-test specifications; specifications for desirable illumination; specially designed reflector and lens; parabolic-reflector disadvantages; photometric-test values.

Headlights of Vehicles and Glare (I fanali di testa dei veicoli e l'abbagliamento), G. Peri. Industria, vol. 38, no. 10, May 31, 1924, pp. 274–276, 8 figs. Discusses regulation of glare by changing position of light in reflector.

Paris Show. Novel Brake Mechanism and Dozen New Models Are Paris Show Features, W. F. Bradley. Automotive Industries, vol. 51, no. 15, Oct. 9, 1924, pp. 633–634, 1 fig. Great increase in fabric bodies and gain in overhead-valve engines.

Rear-Axle Shafts. Hot-Swaging of Rear-Axle Shafts, R. A. DeVlieg. Soc. Automotive Engrs.—Jl., vol. 14, no. 5, May 1924, pp. 507–510, 4 figs. Description of machines used and their mode of operation, and difficulties attendant upon their development.

Starting and Lighting Apparatus, Electrical. Electrical Manufacturers and Service Men Adjust Differences, C. P. Shattuck. Automotive Industries, vol. 51, no. 13, Sept. 25, 1924, pp. 563–566, 4 figs. Report of standards committee of Automotive Elec. Assn., on classification of standard lighting generators, starting motor and recommended practice in wiring.

Studebaker. New Features Involved in Studebaker Brake Linkage and Transmission. Automotive Industries, vol. 51, no. 13, Sept. 25, 1924, pp. 570–571, 3 figs. Details of four-wheel brake system which operates through a servo mechanism, and which is optional on all models. Transmission on Standard Six is very similar to that on other models.

Tires. See TIRES, RUBBER.

Vauxhall. Care and Maintenance of the 14 Hp. Vauxhall. Autocar, vol. 53, nos. 1505 and 1506, Aug. 22 and 29, 1924, pp. 323–325 and 383–385, 10 figs. Hints and advice on upkeep of four-cylinder car.

AVIATION

Commercial. Adequate Landing-Fields Will Develop a Commercial-Aviation Industry, A. A. G. Fokker. Soc. Automotive Engrs.—Jl., vol. 14, no. 5, May 1924, pp. 504–506 and 510. Shows that great progress in commercial aviation has been made in America during last three years, especially with reference to Air-Mail Service. Gives instances where additional airplane routes are feasible even now in United States. European aviation development. Urges necessity for attaining ability for aircraft to fly at night and specifies advantages secured in Europe now by combined over-night railroad-and-airplane service. "Wild" flying; classification of aerial transport. Provision of landing fields throughout United States urged as a present necessity. Future aviation probabilities and development of aerial traffic.

B

BEARINGS

Shaft. Modern Shaft Bearings (Moderne Wellendrucklager), J. Schowalter. Wärme, vol. 47, no. 31, Aug. 1, 1924, pp. 359–361, 6 figs. Comparison of design and working of a collar thrust bearing and a Vulcan single-disk segmental bearing for a propeller running at 75 r.p.m. and for 20,000 kg. thrust, and their field of application.

BEARINGS, BALL

Formulas for and Properties of Ball and Roller Bearings (Alcune formole e proprieta notevoli nella cinematica dei cuscinetti protanti a sfere e a rulli), S. R. Treves. Industria, vol. 38, no. 9, May 15, 1924, pp. 242–245, 5 figs. Develops formulas for calculating peripheral speed, coefficient of resistance, etc.

BEARINGS, ROLLER

Railway Roller Stock. Roller Bearings for Railway Rolling Stock (Rollenlager für Eisenbahnfahrzeuge), W. Lindner. Kruppsche Monatshefte, vol. 5, Aug.-Sept. 1924, pp. 187–189, 2 figs. Details of design of Krupp bearings, function of parts, lubrication, etc.

BELT DRIVE

Arc of Contact, Increasing. Methods That May be Applied for Increasing Arc of Contact With Low Belt Tension, F. E. Gooding. Indus. Engr., vol. 82, no. 9, Sept. 1924, pp. 417–422 and 455, 16 figs. Describes special mechanical means whereby distance between shafts may be shortened and pulley ratios increased over usual recommended practice.

Group vs. Individual Drive. A Comparison of Group and Individual Drive, R. W. Drake. Indus. Mgt. (N. Y.), vol. 68, no. 3, Sept. 1924, pp. 178–183, 6 figs. Analysis of factors which govern a choice.

BELTING

Lumber Industry. Transmission and Conveyor Belts in New Long-Bell Lumber Mill, W. A. Scott. Belting, vol. 25, no. 3, Sept. 1924, pp. 21–24, 9 figs. Large new plant of Long-Bell Lumber Co., Longview Wash., contains latest improved design of modern equipment; belting installations highly efficient.

Rubber. How Much Power Is That Rubber Belt Transmitting?, W. F. Schaphorst. Belting, vol. 25 no. 3, Sept. 1924, pp. 29–30, 1 fig. Gives table for determining horsepower being transmitted by rubber belt.

Rubber Belting, G. A. Frenkel. Machy. (N. Y.), vol. 31, no. 2, Oct. 1924, pp. 122–124. Data and formulas required in designing rubber-belt transmissions.

Types. Characteristics and Attributes of Certain Classes of Belting, W. Staniar. Belting, vol. 25, no. 3, Sept. 1924, pp. 17–20, 2 figs. Combination of oak and special tannage declared "last word" in leather belting; other types also show improvement; discusses leather, rubber, metallic stitched fabric, and solid woven hair belting.

BLAST-FURNACE GAS

Cleaning. Electrical Cleaning of Blast Furnace Gases, N. H. Gellert. Blast Furnace & Steel Plant, vol. 12, no. 9, Sept. 1924, pp. 423–426. Discussion of different methods.

Economical Use. Blast-Furnace Gas Economy in German Iron Works, K. Rummel. Iron & Coal Trades Rev., vol. 109, no. 2943, July 25, 1924, pp. 156–157, 6 figs. Discusses economic uses of gases, gas-fired vs. coal-fired boilers, gas-engine power stations vs. steam-turbine power stations with gas-fired boilers, waste-heat boilers behind gas engines, etc. Abstract of paper read before World Power Conference.

BLAST FURNACES

Practice, Alabama. Blast-Furnace Practice in Alabama, H. E. Mussey. Am. Inst. Min. & Met. Engrs.—Trans., no. 1376-S, Oct. 1924, 15 pp., 8 figs. In summarizing practice of district it may be stated that Southern practice is disposed to carry higher stove temperatures than Northern plants, also blast volume for given size of stack is higher; increased production may be expected as result of even larger furnaces than those now classified as large.

Tuyères. Number, Form, Diameter and Position of Blast-Furnace Tuyeres. Effect of Their Number on the Efficiency of Blast Furnaces (Nombre, Forme, diamètre et position des tuyères de hauts fourneaux. Influence du nombre des tuyères sur la marche du fourneau), M. M. Derclaye. Revue de Metallurgie, vol. 21, nos. 6, 7 and 8, June, July and Aug., 1924, pp. 315–337, 396–421 and 450–461, 14 figs. Calculation of tuyeres for any blast furnace; considerations limiting number of tuyeres, position of tuyeres round crucible, etc. Determination of total and partial heat balances. New theory of Mathesius and its application to heat balances.

BOILER EXPLOSIONS

British Legislation. Steam Boiler Explosions. Colliery Guardian, vol. 128, no. 3324, Sept. 12, 1924, pp. 674–675. Abstract of memorandum prepared by C. E. Stromeyer, chief engineer of Manchester Steam Users' Assn. for Prevention of Steam Boiler Explosions, dealing exclusively with steam-boiler clauses of new British Factories Bill.

BOILER FEEDWATER

Concentration Control. Systematic Control of Boiler-Water Concentration, C. M. Ware. Power, vol. 60, no. 17, Oct. 21, 1924, pp. 650–651, 2 figs. Describes three methods, any one of which can be applied according to its relative merit for plant concerned.

BOILER OPERATION

Costs and Economies. Boilers—Operation Cost and Economies, J. A. Whitlow. Elec. Light & Power, vol. 2, no. 10, Oct. 1924, pp. 18–19, 80, 82 and 84. Notes on grate area; kinds of grates and furnaces; feedwater heaters; economizers; superheat; and operating data.

Combustion Control. Combustion Control for Boilers, R. J. S. Pigott. Mech. Eng., vol. 46, no. 10, Oct. 1924, pp. 590–592, 1 fig. Functions involved in operation; possibilities and methods of regulation; design, insulation; human factor in system.

BOILER PLANTS

Equipment. Increasing the Life of Equipment in Power Plants (Erhöhung der Lebensdauer maschineller Einrichtungen in Kraftanlagen), Braunkohle, vol. 23, no. 20, Aug. 16, 1924, pp. 382–392, 20 figs. Boilers and their safety, rules for acceptance tests, care of boilers, signs of wear, action of steam and pressure.

BOILERMAKING

French Shops. Important Boiler Construction in French Shops, G. L. Carden. Boiler Maker, vol. 23, no. 9, Sept. 1924, pp. 249–251, 5 figs. Describes Fives-Lille boiler works which have been enlarged since war and improvements made in Delaunay-Belleville boiler.

BOILERS

Autogenous Welding. Proposed Code of Rules to Govern Autogenous Welding on Steam Pressure Boilers. Boiler Maker, vol. 23, no. 9, Sept. 1924, pp. 257–262, 27 figs. Gives results obtained from tests and recommendations covering use of autogenous welding in steam boilers.

Heat-Balance Calculation. Calculation of the Boiler Heat Balance. Power Plant Eng., vol. 28, no. 19, Oct. 1, 1924, pp. 991–995, 9 figs. Solution of a problem and an analysis of conditions which affect boiler economy over various periods of operation.

Loading for Maximum Efficiency. Loading the Boilers to Obtain Maximum Efficiency, Chas. E. Coburn. Power, vol. 60, no. 17, Oct. 21, 1924, pp. 642–643, 3 figs. Points out that by properly dividing load among boilers in service and by strict attention to keeping controllable losses at their lowest, boiler load may always be maintained at its reasonably highest efficiency.

Locomotive. See LOCOMOTIVE BOILERS.

Multitubular. Results of Tests of Multitubular Boilers with Direct Flow (Résultats d'essai de chaudières multitubulaires à flux direct), M. P. Pourchot. Outillage, vol. 8, no. 8, Aug. 1924, pp. 276–281, 5 figs. Describes recent installation at Louire Mines and Houillères de Montrambert Mines, where special difficulties had to be met; gives evaporation tests with low-grade fuels, etc.

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*Catalogue data of firms marked * appear in the A.S.M.E. Condensed Catalogues of Mechanical Equipment, 1924-25 Volume*

Ratings. Progress in the Rating of Heating Boilers. Heating & Vent. Mag., vol. 21, no. 10, Oct. 1924, pp. 46–48, 1 table. Comparison of three methods, including that announced by Chicago Master Steamfitters' Assn.

Specifications. Technical Specifications for the Supply of Forged or Stamped Pieces of Extra-Soft Rolled Steel for Boilers and Other Steam Vessels (Spécification technique pour la fourniture de pièces forgées ou embouties, en acier laminé extra-doux pour chaudières et autres appareils à vapeur). Associations Françaises de Propriétaires d'Appareils à Vapeur—Bul., vol. 5, no. 17, July 1924, pp. 171–176. Rules established by French Steam Boiler Users' Assn.

Transportation. Boiler Cars for Boilers That Can be Run on to a Krupp Delivery Truck (Kesselwagen mit abfahrbaren Kesseln zum Umschlag des Ladegutes auf Krupp-Sattelschlepper), F. Finckh. Kruppsche Monatshefte, vol. 5, Aug.-Sept. 1924, pp. 167–171, 6 figs. Details of a freight car carrying four boilers crossways, and a motor truck or tractor on to which boilers can be rolled endwise, for more economic transportation.

BOILERS, WATER-TUBE

Temperature Variation. Temperatures in Water-Tube Boilers. Power, vol. 60, no. 16, Oct. 14, 1924, p. 604, 1 fig. Investigations at Rensselaer Inst. show little variation throughout boiler.

BRAKES

Power. Power Brakes on British Railway, W. E. Symons. Ry. & Locomotive Eng., vol. 37, no. 9, Sept. 1924, pp. 281–282, 2 figs. Reviews power-brake situation in Great Britain and discusses vacuum and air brakes.

Switching Service, for. Improving the Gravity Switching Service by Better Braking (Verbesserung des Schwerkraft-Verschiebedienstes durch verbesserte Bremstechnik), Wenzel. Zeit. des Vereines deutscher Ingenieure, vol. 68, no. 38, Sept. 20, 1924, pp. 986–990, 16 figs. Details of Thyssenhütte gravity braking device for railway switching service in which braking action is exerted on wheels by means of braking rails at each side of rail which are actuated by weight of cars passing.

C

CARS

Lubrication. Mechanical Lubrication of Railway-Car Axles (Die mechanische Schmierung der Eisenbahnachsen), W. Friedrich. Zeit. des Vereines deutscher Ingenieure, vol. 68, no. 34, Aug. 23, 1924, pp. 877–879, 7 figs. Details of Schneider-Friedrich system of roller-chain lubrication now being used on all German railway cars; comparative test data of oil-pad and chain lubrication.

Parts Interchangeability. Interchangeability of Parts in Railway Cars (Austauschbau bei Eisenbahnwagen), Klein. Zeit. des Vereines deutscher Ingenieure, vol. 68, no. 37, Sept. 13, 1924, pp. 965–969, 14 figs. Necessity for interchangeability for economic production and repairs of freight and passenger cars, its introduction in Germany, and details of standards.

CARS, COAL

Hopper. Determining the Forces Active in an Automatic Unloader Car with Drop Door (Ermittlung der in einum Selbstentladewagen mit Klappenverschluss wirkenden Kräfte), M. Bieck. Glasers Annalen, vol. 95, no. 5, Sept. 1, 1924, pp. 67–71, 16 figs. Calculation of forces acting on walls and on drop bottom; force of automatic action, etc.

20-Ton. 20-Ton Coal Wagons on the Great Western Railway. Ry. Engr., vol. 45, no. 537, Oct. 1924, pp. 351–353, 5 figs. On each 500 tons of coal conveyed in these cars there is nearly 400 ft. saving in length of trains; their use increases capacity of private owners' sidings by 30 per cent.

CARS, FREIGHT

Bulk Goods. Standard-Gage Fifty-Ton Freight Cars for Transportation of Bulk Goods (Regelspurige 50-t Eisenbahnwagen zur Beförderung von Massengütern), P. Krüger. Kruppsche Monatshefte, vol. 5, Aug.-Sept. 1924, pp. 171–186, 28 figs. Details of construction of freight cars embodying greatest economy and safety, including trucks, frames, automatic unloading arrangements, etc.

Large-Capacity. Introduction of Large-Capacity Freight Cars (Die Einführung der Grossgüterwagen), Flügel. Zeit. des Vereines deutscher Ingenieure, vol. 68, no. 38, Sept. 20, 1924, pp. 977–985, 19 figs. Discusses increase of carrying capacity from 15–20 tons to 50–60 tons, acceleration of circulation of cars, and cheapening of unloading by means of automatic devices; automatic couplings; bunker facilities in free ports; etc.

Manufacture. Economical Manufacture of Goods Trucks, Werner. Eng. Progress, vol. 5, no. 9, Sept. 1924, pp. 189–190, 1 fig. Deals with interchangeability of parts and successful introduction of principles in German shops.

The Manufacture of Railway Coaches in Germany, E. Cramer. Eng. Progress, vol. 5, no. 9, Sept. 1924, pp. 183–189, 20 figs. Quantity production of steel passenger cars; modern truck manufacture; freight trucks for heavy loads; tipping and special trucks; refrigerator cars; central buffer couplings.

CARS, PASSENGER

Dining. New Rolling-Stock for Day East Coast Trains, L. N. E. R. Ry. Gaz., vol. 41, no. 41, Oct. 3, 1924, pp. 439–445, 10 figs. Describes new vehicles, put in service, including all-electric "triplet" restaurant-car sets.

Germany. Standard Passenger Cars for German State Railways (Die Einheitspersonenwagen der Deutschen Reichsbahn), Speer, Zeit. des Vereines deutscher Ingenieure, vol. 68, no. 37, Sept. 13, 1924, pp. 957–964, 19 figs. Details of new type replacing individual types of various states.

Side Girders, Shearing Stress in. Shearing Stress in Passenger Car Side Girders, W. J. Meyer. Ry. Mech. Engr., vol. 98, no. 10, Oct. 1924, pp. 604–608, 12 figs. Analysis of procedure necessary in order to reduce weight without sacrificing strength.

Trucks. The Görlitz Truck (Das Görtlitzer Drehgestell). Glasers Annalen, vol. 95, no. 5, Sept. 1, 1924, pp. 71–73, 4 figs. Comparative data on American and Görlitz trucks, the latter having wheelbase of 11.8 ft. as in six-wheel trucks.

CASE-HARDENING

Locomotive Parts. The Case-Hardening of Locomotive Components. Ry. Engr., vol. 45, no. 537, Oct. 1924, pp. 337–338, 1 fig. Deals with alternative steels and case-hardening factors.

CAST IRON

Structure. Structure of High-Grade Cast Iron (Das Gefüge hochwertigen grauen Gusseisens), R. Kühnel and E. Nesemann. Stahl u. Eisen, vol. 44, no. 35, Aug. 28, 1924, pp. 1042–1044, 5 figs. Discusses microstructure consisting of pearlite, graphite, and phosphide eutectic; difficulty of distinguishing between this and pearlitic casting.

Testing. Mechanical Tests of Cast Iron. Metal Industry (Lond.), vol. 25, nos. 13 and 14, Sept. 26 and Oct. 3, 1924, pp. 307–309 and 331–332. Consideration of the various classes of tests for determining "strength" properties of the metal.

CENTRAL STATIONS

Comines, France. Central Power Station at Comines, J. Gould Coutant. Combustion, vol. 11, no. 4, Oct. 1924, pp. 276–278, 4 figs. Initial installation consists of three 25,000-kw. turbo-generators, served by 10 boilers; details of pulverized-coal equipment; results of pulverized-coal firing have warranted placing of fourth repeat order for apparatus for extensions to station.

Heat Balance. Heat Balance Study, F. H. Rosencrants. Combustion, vol. 11, no. 4, Oct. 1924, pp. 278–283, 2 figs. Analysis of relative merits of various means adopted for reducing loss of heat to condenser and to stack. (Abstract.) Report of Prime Movers Committee of Nat. Elec. Light Assn.

Interconnection with Steel Mills. The Steel Industry and The Electric Utilities, M. Skinner and F. D. Mahoney. Iron & Steel Engr., vol. 1, no. 9, Sept. 1924, pp. 532–536, 3 figs. Discusses advantages of interconnection between electric power systems of larger steel companies and those of neighboring electric utility companies, and difficulties necessary to be overcome.

Saginaw River, Mich. Saginaw River Steam Plant Costs Explained, H. F. Eddy. Power, vol. 60, no. 16, Oct. 14, 1924, pp. 615–616. Author explains cause of exceptionally low cost—$71 per kw. of rated capacity. (Abstract.) Paper before Nat. Elec. Light Assn.

Steam-Turbine, Developments in. Modern Tendencies in Steam-Turbine Power Plants, E. Berg and F. V. Smith. Mech. Eng., vol. 46, no. 10, Oct. 1924, pp. 577–582, 10 figs. High pressure, superheat, reheating, and steam extraction as affecting power-plant economy, and advantages obtained in their adoption for marine propulsion. Calculated analysis of steam and fuel consumption of a 50,000-hp. turbine-electric-drive passenger vessel.

Switching Equipment. Switching Equipment at the Hanover Central Station (Die Schaltanlagen des Grosskraftwerkes Hannover), H. Probst. Elektrotl., vol. 4, no. 8, Aug. 1924, pp. 213–215, 3 figs. Details of switching arrangements; 17,000-kva. generators; 6000 volts stepped up to 45,000–60,000 volt overhead transmission.

COAL

Heating Value and Air Exposure. Loss of Heating Value of Bituminous Coal on Exposure to Air, J. F. Byrne and J. D. Davis. Indus. & Eng. Chem., vol. 16, no. 8, Aug. 1924, pp. 775–778, 5 figs. Method and results of determination of loss in heating value of coal on exposure to air.

Ignition. The Ignition of Coal, R. V. Wheeler. Fuel, vol. 3, no. 10, Oct. 1924, pp. 366–370, 5 figs. Tests to determine what relationship, if any, there is between chemical composition of coal and its ignition temperature; it is concluded that reaction responsible for "self-heating" of coal is mainly one of attachment of oxygen to molecules of high carbon content.

Moisture in. Moisture in Coal, W. S. Patterson. Power Engr., vol. 19, no. 222, Sept. 1924, pp. 329–330. Discusses boiler efficiency and wet coal, moisture and flue gas, moisture and economizer corrosion, moisture and spontaneous combustion, and appearance of wet coal.

Specific Gravity and Ash Content. The Specific Gravity and Ash Content of Coal, T. J. Drakeley and J. R. I. Hepburn. Chem. & Industry, vol. 43, no. 34, Aug. 22, 1924, pp. 277T–278T, 1 fig. Investigation to determine whether relation exists between specific gravity of sample of coal and its ash content; it is shown that no relation exists between true and apparent specific gravities and ash contents of samples of clean coal from same seam; relation exists between true and apparent specific gravities and ash contents of average samples and equation is given for calculating ash content of coal from specific gravity.

COAL HANDLING

Boiler House. Coal and Ash Handling Plant. Eng. & Boiler House Rev., vol. 38, no. 4, Oct. 1924, pp. 135–140, 143–144, 147–148 and 150, 20 figs. Review of principal methods in present-day use for handling of coal and ash in boiler house.

Conveyor, Belt. Use of Conveyor Belts in Modern Coal Storage. Belting, vol. 25, no. 3, Sept. 1924, pp. 36 and 38, 3 figs. Describes methods of handling fuel by American Hominy Co.; coal mechanically handled from freight cars to firebox.

Shipping Plant. Coal-Shipping Plant at the Clarence Works of Messrs. Dorman, Long & Company, Limited. Iron & Coal Trades Rev., vol. 109, no. 2951, Sept. 19, 1924, pp. 469–470, 3 figs. Details of new wharf and loading plant.

COAL STORAGE

Scientific. Scientific Coal Storage. Blast Furnace & Steel Plant, vol. 12, no. 9, Sept. 1924, pp. 418–420, 1 fig. Summary of report of storage of coal committee of Am. Eng. Council.

COMBUSTION

Control. Automatic Combustion Control, J. Fred Weller. Combustion, vol. 11, no. 4, Oct. 1924, pp. 295–297. Deals with essential elements to be controlled, namely, fuel supply in proportion to steam demands, air supply, removal of gases, and maintaining negative furnace pressure.

Combustion Control, E. G. Bailey. Iron & Steel Engr., vol. 1, no. 9, Sept. 1924, pp. 483–487, 5 figs. Discusses problems of control.

CONDENSERS, STEAM

Tubes. Chlorine Keeps Condenser Tubes Clean, C. H. S. Tupholme. Power Plant Eng., vol. 28, no. 20, Oct. 15, 1924, p. 1055, 1 fig. Process and apparatus, known as Chloronome, for continuous and automatic treatment of cooling water with measured trace of chlorine gas to prevent fouling of condenser tubes and other cooling surfaces with deposits of living organisms.

CONVEYORS

Building-Material. Quantity Conveying in Building Construction and Mining (Massenbeförderung bei Hoch- und Tiefbauten), G. Garbotz. Deutsche Bauzeitung, vol. 58, no. 70, Aug. 30, 1924, pp. 137–141, 12 figs. Types of apparatus for conveying building material, including cranes, gravity concrete towers, cement spraying, etc.

Chewing-Gum Plant. Conveyors Handle Chewing Gum, W. B. Ranney. Mgt. & Administration, vol. 8, no. 4, Oct. 1924, pp. 387–390, 10 figs. System in William Wrigley, Jr. Co., Chicago plant.

COUPLINGS

Shaft. Cast-iron Shrouded Shaft Couplings—Comment, W. Roland Needham. Machy. (Lond.), vol. 24, no. 626, Sept. 25, 1924, pp. 816–817, 1 fig. Corollary to article in Machy., Aug. 7, 1924, p. 582.

CRANES

Unloading. Hoisting Apparatus. Electric Unloading Cranes. (Note sur l'étude des appareils de levage. Grues de déchargement à moteurs électriques), G. Catella. Arts et Métiers, vol. 77, no. 45, June 1924, pp. 220–227, 17 figs. Discusses choice of electric motor, calculation of power required, calculation of frame, and stability of crane.

Unloading Plant of the New United Sugar Company at Ham (Somme) [L'installation de déchargement de la Compagnie nouvelle de Sucreries réunies, à Ham (Somme)], C. Dantin. Génie Civil, vol. 85, no. 9, Aug. 30, 1924, pp. 185–189, 7 figs. Details of design and operation of portal gantry and cranes for handling sugar beet; electric drive.

CUPOLAS

Operation. Calculations for Cupola Furnace Operation (Berechnungen für den Kupolofenbetrieb). Zeit. für die Gesamte Giessererpraxis, vol. 45, nos. 29, 30, 33, and 34, July 20, 27, Aug. 17 and 24, 1924, pp. 209–210, 217–219, 242–243 and 250–252. Discusses furnace dimensions, quantity of air of combustion and of gases; and makes calculations for increasing or decreasing charges, etc.

Schürmann Type. Cupola Furnaces (Die Kupolöfen) L. Bolzani. Praktische Maschinen-Konstrukteur, vol. 57, no. 29, Aug. 5, 1924, pp. 411–412, 4 figs. Summary of development and functions of cupola furnaces; describes Schürmann furnace working with preheated air.

CUTTING METALS

Processes. Economics of Metal Cutting Processes (Die Wirtschaftlichkeit der Trennverfahren), Kammerer and M. W. Gleich. Maschinenbau, vol. 3, no. 23, Sept. 11, 1924, pp. 863–865, 3 figs. Compares time and cost of cutting of various rolling-mill products by autogenous and Mars processes, showing advantages of latter, using a cutting disk.

Progress in. Foreign Progress in Cutting Metals, C. A. Beckett. Mech. Eng., vol. 46, no. 10, Oct. 1924, pp. 618–624, 17 figs. Shows manner in which solutions of some of the problems presented have been attempted by foreign experimenters, referring more specifically to problems (1) development of a standard method for testing tool material and material to be cut, (2) development of a standard heat-treating method, and (3) development of methods for testing tool performance.

CUTTING TOOLS

Steel for Standardization of. Standardization of Cutting Steels (Beitrag zur Normung der Schneidstähle), R. Nerrlich. Werkstattstechnik, vol. 18, no. 17, Sept. 1, 1924, pp. 463–466, 3 figs. Terminology of surfaces and angles of edge of cutting tools.

Manufactured by Advertisers — CLASSIFIED LIST OF MECHANICAL EQUIPMENT — Alphabetical List on page 194

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*Catalogue data of firms marked * appear in the A.S.M.E. Condensed Catalogues of Mechanical Equipment, 1924-25 Volume*

D

DIES

Drop-Forging. Vital Factors in Design of Drop Forging Dies, W. Anslow. Can. Machy., vol. 32, no. 10, Sept. 4, 1924, pp. 27–29, 18 figs. Points out that parting line, contraction and balance are important considerations in layout; life of dies, to large extent, is dependent upon design.

Forging-Machine. Steels for Forging Machine Dies, E. R. Frost. Forging—Stamping—Heat Treating, vol. 10, no. 10, Oct. 1924, pp. 368–371, 3 figs. Factors entering into choice of best die steel; points out that no definite formula or rule can be given which will cover many conditions encountered.

DIESEL ENGINES

Double-Acting. American-Developed Double-Acting Diesel Engine. Motorship, vol. 9, no. 9, Sept. 1924, pp. 668 and 673–674, 4 figs. Particulars of new two-cycle, air-injection engine capable of being flanged directly to existing propeller shafts in Shipping Board vessels with minimum hull alterations.

Double Acting Diesels, Johnstone-Taylor. Mar. Eng., vol. 29, no. 10, Oct. 1924, pp. 605–606, 3 figs. Describes designs by two British firms, namely, North Eastern marine and North British design.

More on the Double-Acting Diesel Engine. Motorship, vol. 9, no. 9, Sept. 1924, pp. 659–660, 4 figs. Uniflow port scavenging system developed by M. A. N. (Maschinenfabrik Augsburg-Nürnberg) has given successful test results.

The Worthington Double Acting Diesel. Mar. Eng., vol. 29, no. 10, Oct. 1924, pp. 585–587, 9 figs. Details of new 2-cycle engine, with special reference to cylinder construction.

High-Power. High-Power Diesel Engines (Hochleistungs-Dieselmaschinen), F. E. Bielefeld. Wirtschaftsmotor, vol. 6, no. 7–8, Aug. 25, 1924, pp. 7–8, 4 figs. Discusses compressor and compressorless types; improvements in atomizing and injecting fuel oil; comparison with Scott-Still engine.

Mexican Fuel Oil. Burning Heavy Fuel Oil in Diesel Engines, R. Hildebrand. Eng. Wld., vol. 25, no. 3, Sept. 1924, pp. 167–168, 1 fig. Describes method employed by Fulton Iron Works Co. in solving problem of using heavy fuel oil in Diesel engines.

Power Plants, Use in. Use of Diesel Engines in Power Plants, L. R. Ford. Power Plant Eng., vol. 28, no. 19, Oct. 1, 1924, pp. 1003–1004. Considerations affecting adaptability of Diesel engine. Paper read before N.A.S.E. convention.

DRILLING

Automobile Parts. Drilling Operations on Automobile Parts, H. L. Tigges. Machy. (N. Y.), vol. 31, no. 2, Oct. 1924, pp. 109–111, 7 figs. Gives a number of examples of work performed in automobile plants on heavy-duty drilling machines built by Baker Bros., Inc., Toledo, O., speeds and feeds used for each job and production obtained being mentioned in each case.

DRILLING MACHINES

Boiler-Shop. Economic Drilling Work in Boiler Shops (Wirtschaftliches Bohren in der Kesselschmiede), P. Naumann. Maschinenbau, vol. 3, no. 24, Sept. 22, 1924, pp. 894–896, 5 figs. Discusses principles for construction of drilling machines and describes a two-spindle machine designed accordingly.

Drilling and Milling. Drilling and Milling Work in Large-Scale Machine Construction (Bohr- und Fräswerke im Grossmaschinenbau), A. Schlegelmilch. Zeit. des Vereines deutscher Ingenieure, vol. 68, no. 34, Aug. 23, 1924, pp. 865–871, 18 figs. Details of new combined drilling and milling plant of Schiess Machine Works at Düsseldorf and comparative advantages.

Pneumatic. Economics of Compressed-Air Drilling Machines (Einiges über die Wirtschaftlichkeit von Pressluftbohrmaschinen), G. Salinger. Maschinenbau, vol. 3, no. 24, Sept. 22, 1924, pp. 896–897, 3 figs. Comparison with electric drilling machine; increasing efficiency of pneumatic machine; substituting gliding by rolling friction; shows superiority of roller bearings.

Radial. Locomotive-Frame Drilling Machines (Lokomotivrahmen-Bohrmaschinen), E. Stephan. Maschinenbau, vol. 3, no. 24, Sept. 22, 1924, pp. 897–899, 6 figs. Advantages of drilling over cutting and punching; operation of frame-drilling machines; simultaneous drilling of several frames; etc.

DURALUMIN

Treatment. Duralumin, How It is Treated, Handled and Protected Against Corrosion, H. C. Knerr. Automotive Industries, vol. 51, no. 15, Oct. 9, 1924, pp. 648–650. Instructions for working cover—forming, bending, tube bending, spinning, forging, riveting, welding and soldering; condensed data given on composition, mechanical properties and heat treatment.

E

ELECTRIC DRIVE

Cost Comparison of Steam, Diesel, and. Maximum Prices for Current Supply (Höchstpreise für Stromlieferung), W. Windel. Elektrotechnische Zeit., vol. 45, nos. 38 and 39, Sept. 18 and 25, 1924, pp. 995–1000 and 1027–1032, 9 figs. Theoretical and practical comparison of cost of electric, steam, and Diesel drive, for threshing machines and machine tools. Discussion of question of whether to buy current or produce it; cost of producing a kw-hr.

Transition from Steam to. The Transition from Steam to Electric Drive, E. E. Thomas. Power House, vol. 17, no. 18, Sept. 20, 1924, pp. 21 and 42. Shows that continuity of operation of auxiliaries is often facilitated by house turbines, augmented by electrical ties to main bus, relay protection being included to assure service.

ELECTRIC FURNACES

Heat-Treating. Economics of Electrically Heated Annealing and Hardening Furnaces (Die Wirtschaftlichkeit des elektrisch beheizten Glüh- und Härteofens). Elektrotechnischer Anzeiger, vol. 41, nos. 148 and 149, Sept. 13 and 16, 1924, pp. 802 and 804, and 812–813. Details of various types of furnaces and their operation; advantages of electric furnaces.

Electric Furnace for Continuous Hardening and Tempering Wire, R. H. MacGillivray. Am. Electrochem. Soc., Advance paper No. 10, for Mtg. Oct. 2–4, 1924, pp. 149–151, 3 figs. on supp. plates. Description of furnace, consisting essentially of two units, one an electric-heated air-hardening furnace, approximately 5.48 m. in length, and other an electric-heated, lead drawing pan, quenching being done in oil.

Electric Furnace Installation, R. S. Sawdey. Iron & Steel Eng., vol. 1, no. 9, Sept. 1924, pp. 487–489, 4 figs. Describes electric furnaces installed at Van Dorn Iron Works Co., Cleveland, O.; installation consists of four double-end box-type furnaces.

Medium- and Low-Temperature. Medium and Low Temperature Applications, E. A. Hurme. Iron & Steel Engr., vol. 1, no. 9, Sept. 1924, pp. 503–513, 24 figs. Application of small medium-temperature heat-treating furnaces; hearth-type tool-treating furnaces; tool-steel tempering furnace; large-size medium-temperature furnaces; furnaces for annealing castings; application of electric heat to annealing and hardening wire; applications of low-temperature heating: baking of motor armature; enameling; electric steam boilers; sheet-mill roll heaters.

Melting. Electric Melting Furnaces, J. A. Seede. Iron & Steel Engr., vol. 1, no. 9, Sept. 1924, pp. 490–494, 8 figs. Review of development; refinements in furnace design, accessories and operation; increasing productive capacity of furnace.

Refractories, Effect of Deoxidizing Slag on. Fluorine in the Deoxidizing Slag, and Its Influence on Refractories in Basic Electric Furnace Practice, F. T. Sisco. Am. Electrochem. Soc., Advance paper No. 19, for Mtg. Oct. 2–4, 1924, pp. 257–272. Deoxidizing slag as first formed; analyses of electric-furnace deoxidizing of slags; advantages and disadvantages of fluorine in deoxidizing slag; temperature and fluidity of slag and their effect on roof and walls; etc.

Resistance. An Electric Graphite Resistance Furnace, H. Bruan, A. L. Mehring and W. H. Ross. Indus. & Eng. Chem., vol. 16, no. 8, Aug. 1924, pp. 821–822, 2 figs. Describes furnace which combines features of both Arsem and Tucker furnaces with some new features, and which was designed for such special reactions as those involved in pyrolytic treatment of phosphate rock under non-oxidizing conditions.

Wire-Annealing. Medium Temperature Furnace Installations, C. F. Cone. Iron & Steel Engr., vol. 1, no. 9, Sept. 1924, pp. 494–503, 18 figs. Describes regenerative car-type furnace for annealing of wire, installed in Buffalo plant of Fowler & Union Horse Nail Co.

Electric Furnaces for Medium Temperatures, C. F. Cone. Forging—Stamping—Heat Treating, vol. 10, no. 10, Oct. 1924, pp. 375–379, 8 figs. Points out that regenerative-car type of furnace has eliminated many troubles in preliminary annealing of wire used in manufacture of horse-shoe nails. Paper presented before Assn. Iron & Steel Elec. Engrs.

ELECTRIC LOCOMOTIVES

Development. The Development of the Electric Locomotive, A. H. Armstrong. Mech. Eng., vol. 46, no. 10, Oct. 1924, pp. 608–617, 18 figs. General comparison of steam and electric locomotives; forms of motor drive; electric-locomotive rating; otheograph tests of locomotive impact on rails, etc.

Passenger-Train. Electric Passenger Train Locomotive for the Railway Line Görlitz—Königsberg, Paul Müller. Eng. Progress, vol. 5, no. 9, Sept. 1924, pp. 173–174, 4 figs. Approved 2D1 locomotive with rod drive, for heavy gradients. Supplied by Bergmann Elec. Works, Berlin.

ELECTRIC RAILWAYS

Articulated Trains and Self-Propelled Cars. Articulated Trains and Self-Propelled Cars Ry. Age, vol. 77, no. 15, Oct. 11, 1924, pp. 641–643, 1 fig. Review of report by Committee on Heavy Electric Traction of Am. Elec. Ry. Assn., including study of light-weight equipment.

Car Maintenance. Equipment Maintenance, F. M. Brinckerhoff. Elec. Ry. Jl., vol. 64, no. 13, Sept. 27, 1924, pp. 509–514, 8 figs. Discusses important considerations for expediting inspection and overhaul work; deals with such practical features of shop design as proper areas of floor space, use of lye tanks, provision for paint spraying and spray washing, adequate materials handling, and dipping and baking equipment.

Operation. Present status of Electric Railway Operation (Gegenwärtiger Stand der elektrischen Bahnbetriebe), W. Usbeck. Zeit. des Vereines Deutscher Ingenieure, vol. 68, no. 37, Sept. 13, 1924, pp. 943–949, 20 figs. Reviews present electric railways in Germany, power houses, characteristics of modern distributing plants and their advantages.

Overhead Construction, Germany. Overhead Construction for German Railway. Elec. Traction, vol. 20, no. 9, Sept. 1924, pp. 415–416, 1 fig. Details of unusual refinement in overhead construction on Mittenwaldbahn; overhead is sectionalized or separated into sections which can be disconnected in case of disturbance; for return circuit running rails of track are used; special lighting protection.

Safety Devices. Automatic Safety Devices for A. C. Trains with Special Reference to the Hamburg Elevated (Selbsttätige Zugsicherungsanlagen mit Wechselstrom unter besonderer Berücksichtigung der Anlagen der Hamburger Hochbahn), C. Wolff. Zeit. des Vereines deutscher Ingenieure, vol. 68, no. 37, Sept. 13, 1924, pp. 970–975, 11 figs. Application of Thullen (American) safety system in which a train automatically indicates a section is clear as soon as it has left it.

Sleeping Cars. Sleep Via Traction. Elec. Traction, vol. 20, no. 9, Sept. 1924, pp. 413–414, 1 fig. Describes De Luxe sleeping cars for service between Indianapolis and Louisville.

ELECTRIC WELDING

Repairing Oil-Tank Bottom. Electrically Welded Repairs to Oil Storage Tank Bottoms, L. F. Champion. Min. & Metallurgy, vol. 5, no. 214, Oct. 1924, pp. 493–494, 1 fig. Description of work in placing welded bottom in 55,000-bbl. tank of Pac. Oil Co.

ELECTRIC WELDING, ARC

Heavy Plate. Arc Welding Heavy Plate, H. P. Eagan. Welding Engr., vol. 9, no. 9, Sept. 1924, pp. 20–21, 3 figs. Arc welding of heavy plate can be successfully done if correct methods are used; three fundamental principles must be followed.

Locomotive Repairs. Electric Arc Welding on the Steam Locomotive, W. W. M. Brady. Gen. Elec. Rev., vol. 27, no. 10, Oct. 1924, pp. 687–697, 26 figs. Superior economy and utility of electric arc welding for quickly making reliable repairs and building up worn surfaces.

Ship Repair and Construction. Metal Arc Welded Ships, J. W. Owens. Welding Engr., vol. 9, no. 8, Aug. 1924, pp. 19–22 and 24, 6 figs. Residual stress and other fundamentals in design of metal arc-welded ships and welded structures in general.

Theory. Theoretical Considerations on Electric Arc Welding (Considérations théoriques sur la soudure électrique à l'arc), M. Lebrun. Revue de Métallurgie, vol. 21, no. 8, Aug. 1924, pp. 484–495, 20 figs. Electric characteristics of a welding arc; effect of kind of current and of covering of electrodes; characteristics of electrodes.

ELECTRIC WELDING, RESISTANCE

Spot-Welding Machine. A Krupp Spot Welding Machine (Eine Kruppsche Punktschweissmaschine), J. Pretzschner. Kruppsche Monatshefte, vol. 5, July 1924, pp. 122–126, 7 figs. Details of an electric spot-welding machine using Krupp non-rusting steel, and its many applications.

ELEVATORS

Drum-Type Machine. Operation of Electric Elevator Machines—Drum-Type Equipment, F. A. Annett. Power, vol. 60, no. 16, Oct. 14, 1924, pp. 609–612, 5 figs. Describes different classes of elevator machines in use and operation of drum-type machine both for overhead and basement installations.

Swinging-Cradle Type. Swing- or Finger-tray Elevator for Handling Fresh Fruit in Crates, Barrels and Cases, G. F. Zimmer. Indus. Mgt. (Lond.), vol. 11, no. 16, Oct. 1924, pp. 445–447, 3 figs. Describes swinging-cradle type of elevator, great size of which is necessary in order to accommodate largest crates and barrels in which fruit is imported; consists of five parts, viz., main steel structure, two endless chains, cradles, feeding-on and delivering-off gear.

EMPLOYMENT MANAGEMENT

Employee's Industrial Past. The Employee's Past, D. A. Laird. Indus. Mgt. (N. Y.), vol. 68, no. 3, Sept. 1924, pp. 152–160, 11 figs. Value of dispassionate records in employment work.

EVAPORATION

Air-Current. The Effect of a Current of Air on the Rate of Evaporation of Water Below the Boiling Point, G. W. Himus and J. W. Hinchley. Chem. & Industry, vol. 43, no. 34, Aug. 22, 1924, pp. 840–845, 11 figs. Deals with certain aspects of evaporation of water in currents of air and treats of evaporation from water surfaces at different temperatures under varying conditions of draft.

EVAPORATORS

Vacuum. Calculation of Heating Surface for Vacuum Evaporators (Calcul des surfaces de chauffe dans appareils d'évaporation sous le vide), Dessin. Arts et Metiers, vol. 77, no. 47, Aug. 1924, pp. 287–302, 8 figs. Principle of multiple-effect vacuum evaporators; determination of heating surface and coefficient of evaporation; temperature drop; apparatus of single, triple, and quadruple effect.

F

FACTORIES

Equipment Maintenance. Maintenance of Plant Equipment, W. L. Hitt. Mgt. & Administration, vol. 8, no. 1, July 1924, pp. 43–45, 1 fig. Maintenance of plant equipment at East Pittsburgh plant of Westinghouse Elec. & Mfg. Co. Describes organization of maintenance department, doors and windows, cleaning electric-light globes and reflectors, upkeep of fire equipment, and care of belting.

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*Catalogue data of firms marked * appear in the A.S.M.E. Condensed Catalogues of Mechanical Equipment, 1924-25 Volume*

FIRE PROTECTION

Alarm System. The "Gravity" Fire Alarm System. Colliery Guardian, vol. 128, no. 3226, Sept. 26, 1924, p. 811, 3 figs. Describes automatic fire-alarm system, dependent solely upon gravity for its motive power.

FIREBRICK

Porosity. Determination of Porosity of Firebrick (Porositätsbestimmungen an feuerfesten Steinen), E. Steinhoff and M. Mell. Berichte der Fachausschüsse des Vereins deutscher Ei enhüttenleute (Werkstoffausschuss), no. 44, Apr. 4, 1924, 6 pp., 3 figs. Examines six processes. Advantages of mercury displacement process. Describes new apparatus for its application.

FITS

British Standards. German Locomotive Works Uses British Limits and Fits (Masznahmen einer deutschen Lokomotivfabrik zur Anwendung der englischen Passungsnormen), T. Damm. Werkstattstechnik, vol. 18, no. 18, Sept. 15, 1924, pp. 481–484, 6 figs. Details of limits and fits of British Eng. Standards Assn. and interchangeable parts adopted by Hanover Machine Works.

FLIGHT

Fuel Economy in. Fuel Economy in Flight, H. T. Tizard. Roy. Aeronautical Soc.—Jl., vol. 28, no. 166, Oct. 1924, pp. 604–624, 7 figs. Author discusses following questions into which he divides problem: (1) What are principles governing most economical use of airplane in flight, having regard to weather conditions; (2) What are principles underlying design of airplanes to secure maximum efficiency of operation..

FLOW OF GASES

Pipes. Flow of Gas or Air in Pipes, Franklin H. Smith. Blast Furnace & Steel Plant, vol. 12, no. 10, Oct. 1924, pp. 448–449, and 451. By using formulas given, both high- and low-pressure flows may be estimated.

FLOW OF STEAM

Supersaturation Losses. Losses Due to Supersaturation in the Efflux of Steam (Su le perdite per soprasaturazione nell'efflusso del vapore d'acqua), E. Foa. Industria, vol. 38, no. 9, May 15, 1924, pp. 245–250, 2 figs. Develops formulas for calculating losses and velocity from degree of undercooling of condensation, and variation of undercooling in successive expansion.

FLOW OF WATER

Closed Conduits. Hydraulic Efficiency Tests on 43,000-h.p. Unit by the Gibson Method and the Allen Method, W. R. Way. Eng. Jl., vol. 7, no. 10, Oct. 1924, pp. 625–633, 9 figs. Tests carried on under operating conditions; Gibson method for measuring flow of water in closed conduits; test by salt-velocity method for measurement in large conduits, developed by Prof. Chas. M. Allen.

FLYING BOATS

Rohrbach Ro II. The Rohrbach Ro II Twin-Engined Flying Boat. Aviation, vol. 17, no. 14, Oct. 6, 1924, pp. 1084–1085, 2 figs. Describes flying boat built to designs of Paul Rohrbach by Metal Aeroplan A. S. of Copenhagen, Denmark. Span 95 ft. 8 in., overall length 54 ft. 6 in., weight empty 8360 lb., and normal weight loaded 13,750 lb.

FORGINGS

Steel, Brittleness of. Brittleness of Steel Due to Tempering After Being Forged Cold (Om anlöpningssprödhet), G. Wazau. Jernkontorets Annaler, no. 7, 1924, pp. 343–360, 19 figs. Examples where steel parts, which have been drawn after having been worked in cold condition, have become very brittle, and investigation of such breaks by means of etching of sections according to Fry's method.

Steel, Testing of. Proposed Definitions and Specifications for Tests of Iron and Steel Forgings and Steel Castings | Förslag till begreppsbestämningar (nomenklatur) vid provning av metallers draghallfasthet m. m.,] J. O. Roos. Jernkontorets Annaler, no. 8, 1924, pp. 404–450, 2 figs. Communication from Government Testing Inst. Gives nomenclature referring to tensile-strength measurements of steel and iron in Swedish, English, French and German, also test specifications of several countries.

FOUNDRIES

American Decrease. Decrease in Foundries Noted. Foundry, vol. 52, no. 20, Oct. 15, 1924, pp. 801–805, 7 figs. Statistics indicate less number of castings plants in operation in 1924 than in 1922.

European and American, Comparison of. European and American Foundries Compared, H. M. Lane. Foundry Trade Jl., vol. 30, no. 422, Sept. 18, 1924, p. 245. Extract from paper presented to South. Metal Trades Assn.

German Practice. German Foundry Practice, Werner Foundry Trade Jl., vol. 30, no. 421, Sept. 11, 1924, pp. 229–230 and (discussion) 230 and 232. Recent advances. Details of tests. Abstracts of address at Int. Foundry Trades Exhibition.

Gray-Iron. Tunnels Facilitate Handling of Material in New Foundry, P. Dwyer. Iron Trade Rev., vol. 75, no. 14, Oct. 2, 1924, pp. 879–883 and 897, 11 figs. Also Foundry, vol. 52, no. 20, Oct. 15, 1924, pp. 806–812, 10 figs. Description of new foundry of Studebaker Corp., at South Bend, Ind., and notes on methods employed. Designed and equipped for a potential melting capacity of 400 tons of gray-iron castings per day.

FREIGHT HANDLING

Monorail Overhead Carrying System. Relieving Railway Terminal Freight Congestion, J. L. Miller. Can. Machy., vol. 32, no. 12, Sept. 18, 1924, pp. 34–36, 2 figs. In author's opinion, overhead carrying system of monorail type offers greatest degree of flexibility and economy in handling goods in freight sheds.

FUEL ECONOMY

High Temperatures and. Fuel Economy and the Measurement of High Temperatures, R. Hadfield. Iron & Coal Trades Rev., vol. 109, no. 2946, Aug. 15, 1924, pp. 273–274. Discusses steam boilers, forge furnaces and furnaces for heat treatment of steel, temperature measurement in furnace, flame temperature, and furnace efficiency, regenerators and recuperators, heat transmission and heat balance in furnaces and melting furnaces. Abstract of paper read before First World Power Conference.

Railway Service. Heat Economy and Railway Service, Landsberg. Eng. Progress, vol. 5, no. 9, Sept. 1924, pp. 170–172. Points out that German state railways consume 9 to 12 per cent of total German coal production; economic efficiency of locomotives; influence of load; other fuel consumers.

FUELS

Coal. See COAL; PULVERIZED COAL.

Lignite. See LIGNITE.

Oil. See OIL FUEL.

Peat. See PEAT.

Producer Gas. See PRODUCER GAS.

Pulverized Coal. See PULVERIZED COAL.

Recovery from Ashes. Recovering the Unburned Fuel from Ashes, S. H. Bunnell. Combustion, vol. 11, no. 4, Oct. 1924, pp. 287–288, 2 figs. Describes three German inventions in practical use for recovering usable coke from common ashes, namely, magnetic ash separator produced by Krupp Works, Weber system, and Schilde system.

Technology. Notes on Recent Developments in Fuel Technology, R. Wigginton. Fuel, vol. 3, no. 10, Oct. 1924, pp. 343–345. Utilization of coal in America; steam accumulator; pulverized fuel; cracking of oils; purification of coal gas; atomic energy as source of power; coking power of coal.

FURNACES, ANNEALING

Fisher. New Annealing Equipment for Strip Steel. Iron Age, vol. 114, no. 15, Oct. 9, 1924, pp. 907–909, 5 figs. Notes on new annealing equipment of Worcester Pressed Steel Co., Worcester, Mass. Electric mule on rack for charging; ample combustion space in furnaces; arrangement for cooling boxes and quick charging of furnaces.

G

GARAGES

Construction. New Large-Scale Garage (Eine neue Massengarage), H. Luckhardt. Motorwagen, vol. 27, no. 23, Aug. 20, 1924, pp. 411–413, 6 figs. Details of patented arrangement in which stalls are placed at angle of 45 deg. instead of 90 deg., giving greater accommodation.

Problem of Garage Construction (Das Problem des Kraftwagenhauses), F. Pistor. Wirtschaftsmotor, vol. 6, no. 7–8, Aug. 25, 1924, pp. 1–6, 6 figs. Details of Pistor system of construction in which garage is a multiple-story roundhouse with drive-in car stall and drive-out in a continuous curve; no elevators.

GAS PRODUCERS

Slagging. The Slagging Producer in Steel Works, K. Huessener. Iron & Steel Engr., vol. 1, no. 9, Sept. 1924, pp. 457–464, 3 figs. History, description, uses and advantages.

GASOLINE

Natural-Gas. Application of Refrigeration Processes to the Production of Natural Gasoline, E. F. Burton. Refrig. Eng., vol. 11, no. 3, Sept. 1924, pp. 83–90, 8 figs. Notes based upon experience and observation of author and information obtained through publications of Bur. of Mines and other publications; author believes that more attention should be given to utilization of waste residue gas for production of low temperatures through expander, and that further investigation be made of possibilities of using more volatile parts of plant product, especially propane, for cooling gases.

GASOLINE ENGINES

Water Condensation from Exhaust Gas. Heat Transfer in the Condensation of Water from Engine Exhaust Gas, Rob. F. Kohr and L. Butler. Indus. & Eng. Chem., vol. 16, no. 9, Sept. 1924, pp. 885–889, 8 figs. Describes apparatus devised by Bur. of Standards for condensing large part of water contained in exhaust, thus making it possible continually to compensate during flight of gas-filled airships for weight of fuel burned.

GEAR CUTTING

Processes. Bases and Recent Progress in Gear Cuting (Grundlagen und neuere Fortschritte der Zahnrädererzeugung), K. Kutzbach. Zeit. des Vereines deutscher Ingenieure, vol. 68, nos. 36 and 41, Sept. 6 and Oct. 11, 1924, pp. 913–920 and 1075–1081, 74 figs. Discusses various kinds of gears, teeth and gear-cutting apparatus; grinding processes.

Tooth-Section Generator. An Improved Photomechanical Tooth-section Generator, H. E. Merritt Machy. (Lond.), vol. 24, no. 625, Sept. 18, 1924, pp. 777–779, 6 figs. Describes improved form of apparatus for obtaining a large-scale profile of any generated gear-tooth section by a photographic process. Gives a tooth section in white on a black ground.

Truck Drive. Machining Gears for an Electric-Truck Driving Mechanism, F. H. Colvin. Am. Mach., vol. 61, no. 14, Oct. 2, 1924, pp. 535–537, 11 figs. Describes machining of gears for drive of trucks built by Commercial Truck Co., Phila., Pa. Special tools for undercutting; fixtures for hardening bore of gear; overcoming distortion in large internal gears.

GEARS

Design. Gear Designing Tables, L. S. Burbank. Machy. (N. Y.), vol. 31, no. 2, Oct. 1924, pp. 141–143. Gives four tables which provide a simple and direct method of determining relation between pitch and power-transmitting capacity of either spur gearing or bevel gearing.

Double Helical. Proper Profile of Miller for Double Helical Spur Gear (Das richtige Profil des Fingerfräsers für Kammwalzen), B. Szöke. Werkstattstechnik, vol. 18, no. 16, Aug. 15, 1924, pp. 417–421, 18 figs. Discusses calculation of theoretically correct construction, and approximations deduced from it, correcting a general error in profile.

Helical, Calculation of. Helical Gear Problems Simplified, O. M. Burkhardt. Am. Mach., vol. 61, no. 14, Oct. 2, 1924, pp. 529–530. Method of calculation which will render graphical solutions far more accurate than before.

Pinions, Dynamic Stresses in Rotating. Mathematical Theory of Dynamic Stresses in Rotating Gear Pinions, P. Heymans. Mech. Eng., vol. 46, no. 10, Oct. 1924, pp. 583–587 and (discussion) 587–589, 3 figs. Theoretical study of dynamic stresses in rotating gear pinions developed in course of investigation by photoelastic method of stresses in gear pinions undertaken by Research Laboratories and Ry. Motor Eng. Dept. of Gen. Elec. Co., Schenectady, N. Y., conducted at Mass. Inst. Technology Shows that in all disturbed elastic media a force applied cyclically along any closed contour results in oscillatory deformations and corresponding dynamic stresses. Likewise in rotating gear pinions a torque acting on perfectly formed and spaced gear teeth sets up similar dynamic stresses.

Quiet, Production of. Quiet Gears and Their Production. Soc. Automotive Engrs.—Jl., vol. 14, no. 5, May 1924, pp. 545–557, 14 figs. Symposium regarding advantages of the various production methods that have been adopted by several of the leading automobile companies for reducing noise of gears and results that have been obtained by use of these methods, containing following papers: Some Sidelights on the Gear Problem, W. R. Griswold; Need of Grinding Carburized and Hardened Gears, O. H. Schafer; Oil-Treated Steel and Ground Gears, L. A. Danse; Polishing and Burnishing of Gear Teeth, R. E. Linn; Checking Tooth-Forms by the Comparator, W. G. Hildorf; and Importance of Accuracy of Tooth-Form, A. H. Frauenthal.

Spur, Strength of. The Strength of Spur Gears. Automobile Engr., vol. 14, no. 193, Sept. 1924, pp. 262–264, 6 figs. Gives method of accurately estimating stresses involved.

Teeth, Shape of. Effect of Shape of Tooth on the Quality of the Gear (Der Einfluss der Zahnform auf die Güte der Verzahnung), G. Olah. Werkstattstechnik, vol. 18, nos. 16 and 17, Aug. 15, and Sept. 1, 1924, pp. 424–427, and 456–461, 25 figs. Proposed standardization of curves of teeth; conditions gearings must fulfil; comparison of different kinds of involute teeth in order to find most favorable shape.

GRINDING

Regrinding Practice. Regrinding Methods Outlined, B. K. Price. Abrasive Industry, vol. 5, no. 9, Sept. 1924, pp. 226–230, 7 figs. Practice at plant of Houpert Machine Co., Long Island City, N. Y., in regrinding cylinders.

Textile Castings. Grinding Braiding Machine Parts Rapidly and Accurately, H. R. Simonds. Abrasive Industry, vol. 5, no. 9, Sept. 1924, pp. 221–224, 7 figs. Account of abrasive operations pursued in finishing textile castings.

GRINDING MACHINES

Circular. Logarithmic Diagram for Determining Machining Time for Circular Grinding Machines (Logarithmisches Diagramm zur Maschinenzeitbestimmung von Rundschleifmaschinen), G. Ganz. Werkstattstechnik, vol. 18, no. 17, Sept. 1, 1924, pp. 461–463, 5 figs. Calculation of time for piece work by means of a diagram; reversing of machines and its effect on time of grinding, etc.

Surface. Feed Arrangement in Diskus Surface Grinding Machines (Die Werkstückbewegung bei Diskus-Flächenschleifmaschinen), C. Krug. Werkstattstechnik, vol. 18, no. 17, Sept. 1, 1924, pp. 452–455, 7 figs. Discusses uniform and irregular movement of work table; arrangement of inclined planes with oil feed; hydraulic drive with automatic control.

H

HAMMERS

Pneumatic. Economic Study of Forging Practice with Special Regard to Pneumatic Hammers (Wirtschaftlichkeitsstudie des Schmiedebetriebes unter besonderer Berücksichtigung der Schmiedelufthämmer) M. Cyron. Glasers Annalen, vol. 94, nos. 1, 6, 12 and vol. 95, no. 4, Jan. 1, Mar. 15, June 15 and Aug. 15, 1924, pp. 3–11, 65–72, 154–162 and 56–64, 49 figs. Deals with phenomena in connection with iron and steel forging; behavior of steam and pneumatic hammers from economic viewpoint; practical investi-

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Alphabetical List on page 194

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gations on most important types of pneumatic hammers; two-cylinder hammers, drop hammer for testing, and results of tests of various types of hammers.

HARDNESS

Ball Hardness Testing. The Ball Indentation Hardness Test, S. L. Hoyt. Am. Soc. Steel Treating—Trans., vol. 6, no. 3, Sept. 1924, pp. 396–420, 4 figs. Refers to Eugen Meyer's investigation of Brinell's ball indentation hardness test first published in 1908 in which he showed that hardness of metal cannot truly be represented by one figure, or, in other words, resistance to penetration varies with degree of penetration of ball; author of present paper discusses Meyer's analysis to throw light on our present methods of hardness testing.

HEAT TRANSMISSION

Pipes. Heat Transfer in Small Pipes, F. C. Blake and W. A. Peters, Jr. Indus. & Eng. Chem., vol. 16, no. 8, Aug. 1924, pp. 845–846, 2 figs. Method developed by authors of measuring water temperature by drawing off portion.

Research. Research in Heat Transmission, E. Buckingham. Refrig. Eng., vol. 11, no. 3, Sept. 1924, pp. 91–94. Conduction, relation and convection; conduct of research in heat transmission; employment of dimensional analysis; variables involved in complete mathematical theory of heat transmission; suggestions in regard to planning of research programs.

HEATING, ELECTRIC

Industrial. Electric Heating with Special Reference to Central Stations, E. D. Sibley. Iron & Steel Engr., vol. 1, no. 9, Sept. 1924, pp. 513–515, 1 fig. Shows present development of electric heating.

HEATING, HOT WATER

Central Stations. Use of Mechanical Devices in Central Hot-Water and Steam Heating Plants (Emploi d'organes méchaniques dans les installations de chauffage central par l'eau et la vapeur), A. Nessi. Chaleur & Industrie, vol. 5, no. 52, Aug. 1924, pp. 389–396, 9 figs. Discusses use of centrifugal pumps, vacuum pumps, fans, and their operation in connection with heating plants; reduction of fuel consumption.

HYDRAULIC TURBINES

Discharge Losses. Energy Losses of Hydraulic Turbines at Discharge (Énergie perdue par les organes de décharge des turbines hydrauliques), J. Calame. Bulletin Technique de la Suisse Romande, vol. 50, nos. 16, 18 and 19, Aug. 2, 30 and Sept. 13, pp. 197–201, 228–232, and 237–241, 15 figs. Discusses calculation of water losses due to frequent and extreme variation of load; compensating errors of evaluation of water losses; gives numerical calculation for various plants.

High-Speed. High-Speed Hydraulic Turbines (Turbine hydraulique extra-rapide), F. Prasil. Revue Générale de l'Électricité, vol. 16, nos. 7 and 8, Aug. 16 and 23, 1924, pp. 274–280, and 311–321, 35 figs. Discusses tendencies in turbine construction and describes improvements made by Th. Bell & Co., Switzerland, in their type of high-speed turbine; details of tests carried out at Bell shops.

Pelton. Units of Pelton Wheels Under Varying Conditions (Die Einheitsgrössen der Becherturbinen unter wechselnden Bedingungen), G. Karrass. Zeit. des Vereines deutscher Ingenieure, vol. 68, no. 35, Aug. 30, 1924, pp. 902–904, 9 figs. Discusses peripheral velocity, friction, hydraulic efficiency, torque, and specific r.p.m., and makes calculations.

Properties. Properties of Hydraulic Turbines with Constant Number of Revolutions and Very Variable Head (Die Eigenschaften der Wasserturbinen bei gleichbleibender Drehzahl und stark veränderlichem Gefälle), R. Dubs. Zeit. des Vereines deutscher Ingenieure, vol. 68, no. 34, Aug. 23, 1924, pp. 872–876, 10 figs. Shows, on basis of characteristic braking curves, how these curves may be used for determining properties and efficiency of turbine of constant revaluation and variable head; gives application of results of three braking tests.

HYDROELECTRIC DEVELOPMENTS

Big Creek, California. Progress on the Big Creek Hydro-Electric Project, D. H. Redinger. Compressed Air Mag., vol. 28, no. 12, Dec. 1923, vol. 29, nos. 1, 3, 4, 9 and 10, Jan., Mar., Apr., Sept. and Oct. 1924, pp. 720–724, 747–750, 803–808, 837–842, 989–992 and 1013–1017, 76 figs. Outline of part of undertaking being pushed forward by Southern Cal. Edison Co.; details of work in connection with power houses nos. 1, 2, 3 and 8, Shaver Lake tunnel, dams, etc.

Ontario. Power Generation on the Kaministiquia River. Power House, vol. 17, no. 18, Sept. 20, 1924, pp. 19–20, 3 figs. Development at Kakabeka Falls, Ont., operating under 180-ft. head; main source of electricity supply for cities of Port Arthur and Fort William.

HYDROELECTRIC PLANTS

Design. Regulating Guaranties for Hydraulic Plants (Reguliergarantien für Wasserkraftanlagen), K. Lubowsky. Elektrotechnische Zeit., vol. 45, no. 39, Sept. 25, 1924, p. 1025. Discusses difficulties in design of plants to reconcile demand for reduction of moments of gyration (reduction of generator mass), with keeping low variation in voltage connected with load fluctuations.

Ice Troubles. Measures Taken in Sweden Against Ice Troubles at Water Power Plants, A. F. Samsioe. Engineering, vol. 138, no. 3065, Sept. 26, 1924, p. 463. Paper, abridged, contributed to Sec. B of World Power Conference.

Protective Rack. Construction and Upkeep of Racks for the Protection of Hydraulic Turbines (La construction et l'entretien des grilles pour la protection des turbines hydrauliques). Génie Civil, vol. 85, no. 11, Sept. 13, 1924, pp. 225–230, 5 figs. Details of various types of racks, and mechanical rakes for cleaning them, as installed at Wynau and Beznau, Switzerland, and Chevres.

Spain. High-Voltage Power Supply in Spain. Elec. Rev., vol. 95, no. 2438, Aug. 15, 1924, pp. 253–255, 8 figs. Gives notes on Riegos y Fuerza del Ebro undertaking; describes equipment of various plants.

Whitingham, Vt. The Davis Bridge Power Plant Development of the New England Power Company, E. B. Collins and H. R. Wilson. Gen. Elec. Rev., vol. 27, no. 10, Oct. 1924, pp. 665–672, 11 figs. Located at Whitingham, Vt., and consists of two (ultimately three) 20,000-hp. hydroelectric units. Describes diversion tunnel and spillway, intake structure, pressure tunnel, turbines and generators, low-tension switching equipment, high-voltage equipment, transformers, etc.; can transmit at 66,000 and 110,000 volts simultaneously.

I

ICE PLANTS

Developments. Developments in Ice-Making Plants, H. P. Hill. Power Plant Eng., vol. 28, no. 19, Oct. 1, 1924, pp. 1015–1016. Outline of present practice and probable development as presented to N.A.S.E. convention.

IGNITION

Gas and Oil Engines. Process of Ignition in Gas and Oil Engines (Der Zündungsvorgang in Gas- und Oelmaschinen), R. Schöttler. Wärme, vol. 47, no. 33, Aug. 15, 1924, pp. 381–384, 14 figs. Discusses phenomenon of ignition and its control on basis of experimental work of various scientists.

INDUSTRIAL MANAGEMENT

Budgeting. Budgeting Advertising Expense, J. L. Palmer. Mgt. & Administration, vol. 8, no. 4, Oct. 1924, pp. 394–395, 3 figs. Develops, by assuming a typical case, a possible method of planning and controlling advertising expenditures.

Cost Control. Quality Manufacturing at Predetermined Costs, E. F. Roberts. Factory, vol. 33, no. 4, Oct. 1924, pp. 495–497, 544, 548, 552, 556, 560, 564 and 568, 3 figs. Describes how Packard Motor Car Co. established time standards and how workmen are paid so that variations in time and in cost of labor are kept at minimum; advantages of payment method which is integral part of cost-control system.

Graphic Control. Graphic Control in a Small Hosiery Mill, W. E. Haseltine. Mgt. & Administration, vol. 8, no. 2, Aug. 1924, pp. 161–166, 20 figs. How charts are employed in a small hosiery mill to give control of all factors entering into operation, to show just where enterprise is at a given time and whither it is headed.

Maintenance Division Organization. Organization of Maintenance Division, F. A. Waldron. Mgt. & Administration, vol. 8, no. 1, July 1924, pp. 39–42, 4 figs. Planning its duties for economy of operation.

Maintenance Work. Managing Maintenance Work with Economy, T. Clark. Mgt. & Administration, vol. 8, nos. 2 and 3, Aug. and Sept., 1924, pp. 191–196 and 299–302, 11 figs. Describes application to a construction and maintenance department of a manufacturing plant, of a complete system of planning and routing work, and payment of bonuses based on times determined by accurate time study. Methods of determining and using standard times for repair work.

Prague Conference. Scientific Management at Prague Conference. Mech. Eng., vol. 46, no. 10, Oct. 1924, pp. 624–625. Brief abstracts of papers by American authors presented at First International Management Congress held at Prague, July 20–24, 1924, treating of management problems including industrial relations, budgetary control and education.

Production-Costs Reduction. The Reduction of Production Costs, H. Varley. Indus. Management (Lond.), vol. 11, nos. 2 and 16, Jan. 24, and Oct. 1924, pp. 41 and 437–440. Jan. 24: General observations. Oct.: Cost of machine idleness; justification for new machine; saving of handling time; relative cost of operation; replacing machinery every year.

Pulp and Paper Industry. Paper and Pulp Manufacturing, S. E. Thompson and W. E. Freeland. Mgt. & Administration, vol. 8, no. 4, Oct. 1924, pp. 397–402, 6 figs. Job standardization, wage incentives and bonus plans of general application.

Shoe Factories. Management Factors in the Shoe Industry, S. E. Thompson and W. E. Freeland. Mgt. & Administration, vol. 8, no. 1, July 1924, pp. 75–81, 8 figs. Methods which solve marketing and manufacturing problems.

Time Study. See TIME STUDY.

Tool System. A Well-Planned Tool System. Eng. Production, vol. 7, nos. 143 and 144, Aug. and Sept. 1924, pp. 229–232 and 268–271, 26 figs. Details of comprehensive scheme; discusses tool department, stores, depots, receipt, identification and classification, shortages, issue, replacement, etc.

Waste Elimination. See WASTE ELIMINATION.

INDUSTRIAL RELATIONS

Employees-Management Coöperation. Cooperation in Industry, S. Rea. Min. Congress Jl., vol. 10, no. 9, Sept. 1924, pp. 421–423. Enlightened industrial management recognizes need for direct negotiation and mutual understanding. Principles underlying Pennsylvania Railroad system plan of employee-management relationship.

Improvement. Industrial Relations, Rob. E. Tally. Min. & Metallurgy, vol. 5, no. 214, Oct. 1924, pp. 478–480. Industry created by capital and labor; duties of employer; duties of organization heads and bosses; other factors of influence between employer and employee.

INSULATORS, HEAT

Heat Losses through. Heat Losses through Insulating Materials, R. H. Heilman. Mech. Eng., vol. 46, no. 10, Oct. 1924, pp. 593–602 and (discussion) 602–606, 18 figs. A rational method for their determination by means of conductivity coefficients of materials. Results of 94 tests on commercial pipe coverings and insulating cements conducted at Mellon Inst. Indus. Research of Univ. of Pittsburgh. Describes experimental methods. Discusses from a physical and mathematical standpoint exact character of thermal conductivity and its relation to temperature gradients and differences.

INTERNAL-COMBUSTION ENGINES

Catalysis Applied to. Catalysis and the Internal Combustion Engine, E. Sokal. Chem. & Industry, vol. 43, no. 35, Aug. 29, 1924, pp. 283T–284T. Points out that so far catalytic coating called "Katalite" has been used in engines without any change in engine; it is considered possible and even probable that with certain changes, much greater effects could be produced which might have bearing on utilization of low-grade fuels, running of engines at constant-compression pressure, and various other questions of design and operation.

Detonation. Relative Effects of Some Nitrogen Compounds upon Detonation in Engines, T. A. Boyd. Indus. & Eng. Chem., vol. 16, no. 9, Sept. 1924, pp. 893–895, 3 figs. Data show that, in general, nitrogen compounds which are most effective for suppressing detonations are the primary and secondary amines.

Exhaust-Gas Analysis. Composition of Exhaust Gas of Explosion Motors (Die Abgaszusammensetzung von Explosionsmotoren), M. Moeller and M. U. Rüchling. Motorwagen, vol. 27, no. 23, Aug. 20, 1924, pp. 400–403, 7 figs. Describes Siemens & Halske $CO + H_2$ meter and shows that content in unconsumed gases is dependent on load, compression, nozzle position of carbureter, time of ignition and lubrication of engine.

[See also AIRPLANE ENGINES; AUTOMOBILE ENGINES; DIESEL ENGINES; GASOLINE ENGINES; IGNITION; OIL ENGINES; SEMI-DIESEL ENGINES.]

IRON

Corrosion. The Influence of Emulsoids Upon the Rate of Solution of Iron, J. N. Friend, D. W. Hammond and G. W. Trobridge. Am. Electrochem. Soc., Advance paper No. 14, for Mtg. Oct. 2–4, 1924, pp. 197–207, 6 figs. A possible method is suggested of treating natural and other waters, to render them less corrosive towards ferrous and non-ferrous metals in practice. Results of experiments on corrosion of iron in lead-acetate solution and in copper-sulphate solution; rate of solution of iron in dilute sulphuric acid.

Molten, Specific Gravity of. Method of Determination of the Specific Gravity of Molten Iron and of Other Metals of High Melting Temperature (Metod för bestämning av spec. vikt hos flytande järn och andra svarsmälta metaller), C. Benedicks, D. W. Berlin and G. Phragmén. Jernkontorets Annaler, vol. 108, no. 6, 1924, pp. 308–33, 9 figs. Molten metal is contained in U-shaped tube of very high melting point and difference of levels in two legs of tube is measured by electrical methods; said difference is produced by pressures of inert gas and difference of said pressures is measured by means of mercury column. Report from Swedish Metallographical Inst.

IRON AND STEEL

History. Notes on the History of Iron and Steel, G. E. Trackray. Am. Soc. Steel Treating—Trans., vol. 6, no. 4, Oct. 1924, pp. 443–490. Compilation of some of salient points of history; notes were selected from various records, writings, researches, investigations by archaeologists, and others.

Impact Testing. Periods of Recovery, Temperature, Grain Size, and Force Lines in Repeated-Impact Tests (Erholungspausen, Temperatur, Korngrösse und Kraitwirkungslinien bei der Dauerschlagprobe), E. H. Schulz and W. Prüngel. Berichte der Fachausschüsse des Vereins deutscher Eisenhüttenleute (Werkstoffausschuss), no. 40, Apr. 4, 1924, 7 pp., 12 figs. Shows that periods of recovery of one or more days result in decided increase of final number of blows. Mild steel and wrought iron show a maximum at 175 deg.

Pickling, Bibliography on. Pickling of Iron and Steel; A Bibliography, V. S. Polansky. Blast Furnace & Steel Plant, vol. 12, nos. 7, 8 and 9, July, Aug., and Sept., 1924, pp. 326–328, 368–371, and 431–434. Contains articles on machines and equipment, pickling in acid solutions, pickling in salt solutions, electrolytic pickling, inhibitors and accelerators, effect of pickling, recovery of spent liquors, etc. See also Forging—Stamping—Heat Treating, vol. 10, nos. 7, 8 and 9, July, Aug. and Sept. 1924, pp. 267–269, 298–301 and 350–354.

IRON, PIG

Grading and Mixing. Grading and Mixing of Pig Irons. Metal Industry (Lond.), vol. 25, nos. 7 and 8, Aug. 15 and 22, 1924, pp. 155–156 and 179–180. Discusses American method of grading by analysis; noteworthy changes in American opinion as to

Manufactured by Advertisers — CLASSIFIED LIST OF MECHANICAL EQUIPMENT — Alphabetical List on page 194

Heaters, Feed Water, Locomotive (Open)
* Worthington Pump & Machinery Corp'n

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* Power Specialty Co.
Ross Heater & Mfg. Co. (Inc.)

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* Cochrane Corp'n

Heaters and Purifiers, Feed Water (Open)
* Cochrane Corp'n
Elliott Co.
* Erie City Iron Works
Hoppes Mfg. Co.
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* American Blower Co.
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Sturtevant, B. F. Co.

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Clyde Iron Works Sales Co.
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Lidgerwood Mfg. Co.
Link-Belt Co.
* Shepard Electric Crane & Hoist Co.

Hoists, Air
* Ingersoll-Rand Co.
* Nordberg Mfg. Co.
* Palmer-Bee Co.
* Shepard Electric Crane & Hoist Co.
* Whiting Corp'n

Hoists, Belt
Clyde Iron Works Sales Co.
Lidgerwood Mfg. Co.

Hoists, Chain
* Palmer-Bee Co.

Hoists, Electric
* Allis-Chalmers Mfg. Co.
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* Brown Hoisting Machinery Co.
Clyde Iron Works Sales Co.
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Lidgerwood Mfg. Co.
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* Shepard Electric Crane & Hoist Co.

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Lidgerwood Mfg. Co.

Hoists, Hand Power
* Gillis & Geoghegan

Hoists, Head Gate
Smith, S. Morgan Co.

Hoists, Locomotive & Coach
* Whiting Corp'n

Hoists, Mine
Lidgerwood Mfg. Co.
* Nordberg Mfg. Co.

Hoists, Skip
* Brown Hoisting Machinery Co.
Lidgerwood Mfg. Co.
Link-Belt Co.
Otis Elevator Co.
* Palmer-Bee Co.

Hoists, Steam
(See Engines, Hoisting)

Hoists, Telescopic
* Gillis & Geoghegan

Hose, Acid
* United States Rubber Co.

Hose, Air and Gas
* Goodrich, B. F. Rubber Co.
* United States Rubber Co.

Hose, Fire
* United States Rubber Co.

Hose, Gas
* United States Rubber Co.

Hose, Gasoline
* Goodrich, B. F. Rubber Co.
* United States Rubber Co.

Hose, Metal, Flexible
Johns-Manville (Inc.)

Hose, Oil
* United States Rubber Co.

Hose, Rubber
* Goodrich, B. F. Rubber Co.
* United States Rubber Co.

Hose, Steam
* United States Rubber Co.

Hose, Suction
* United States Rubber Co.

Humidifiers
* American Blower Co.
* Carrier Engineering Corp'n
Sturtevant, B. F. Co.

Humidity Control
* American Blower Co.
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Sturtevant, B. F. Co.
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Mackintosh-Hemphill Co.
* Worthington Pump & Machinery Corp'n

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* American Fluid Motors Co.

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Hydrometers
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Hygrometers
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Ice Tools
* Gifford-Wood Co.

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Hill Clutch Machine & Fdry. Co
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National Co. (Inc.)

Indicator Posts
* Crane Co.
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(Pratt & Cady Division)

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* Uehling Instrument Co.

Indicators, CO_2
Bacharach Industrial Instrument Co.
* Uehling Instrument Co.

Indicators, Engine
* American Schaeffer & Budenberg Corp'n
Bacharach Industrial Instrument Co.
* Crosby Steam Gage & Valve Co.

Indicators, Sight Flow
* Bowser, S. F. & Co. (Inc.)

Indicators, SO_2
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Joints, Swing and Swivel
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Lathes, Turret
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* Bowser, S. F. & Co. (Inc.)
Lunkenheimer Co.

Lubricators, Force-Feed
* Bowser, S. F. & Co. (Inc.)
Lunkenheimer Co.

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* Crosby Steam Gage & Valve Co.
Lunkenheimer Co.

Lubricators (Sight Feed)
* Crosby Steam Gage & Valve Co.
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* American Fluid Motors Co.

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complete chemical grading; difficulties of complete chemical limits; influence of melting conditions difficult of complete explanation on chemical basis; accuracy of analyses, scope of analytical control, scope of control by fracture, graphite condition and thermal influences, and chilling.

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LABOR

Eight-Hour Day. Eight-Hour-Day Application in Continuous Running (Applications simples de la journée de huit heures dans les entreprises à service continu), J. Schwarz. Schweizerische Bauzeitung, vol. 84, no. 10, Sept. 6, 1924, pp. 115–117, 8 figs. Mathematical treatment of on-time and off-time for continuous operations. (In French.)

Eight-Hour Shifts. Economies of Eight-Hour Shifts in Ironworks (Wirtschaftliche Auswirkung der Achstundenschicht in Hüttenwerken), E. Hofmann. Stahl u. Eisen, vol. 44, no. 37, Sept. 11, 1924, pp. 1101–1105, 1 fig. Discusses decrease of output per capita, reasons for failure of eight-hour shifts, influence of length of shift on frequency of accidents and of sickness.

Firemen. Qualitative Remuneration of Firemen (Ein Weg zur qualitativen Bezahlung der Heizerarbeit), K. Münzre. Wärme, vol. 47, no. 35, Aug. 29, 1924, pp. 406–409, 6 figs. Work of firemen and losses in combustion; determining quality of firemen's work; bonus by means of Duplex-Mono slide rule.

Two and Three Shifts. The Working Shift in German Iron and Steel Works. Iron & Coal Trades Rev., vol. 109, no. 2952, Sept. 26, 1924, p. 516. Discusses question of favorable influence on production due to recent introduction of two-shift system (in lieu of previous three-shift system) in German iron and steel works.

LABORATORIES

Hydraulic. The Hydraulic Laboratory of the Instituto Católico de Artes é Industrias (Spain) (Laboratorio hidraulico del I.C.A.I.), J. M. F. de Castro. Anales de la Sociacion de Ingenieros del Instituto Católico de Artes é Industrias, vol. 3, no. 4, 1924, pp. 350–358, 9 figs. Details of mechanical and electrical equipment, and activities of laboratory.

LATHES

Bench. Vidal Precision Bench Lathe. Machy. (Lond.), vol. 24, no. 626, Sept. 25, 1924, pp. 841–843, 6 figs. Describes lathe made by Vidal Eng. Co., Croydon, England; is of 3-in. centers, bed being 33 in. in length; bed is of flat type with sloping edges.

Turret. New Turret Lathe has Greater Power and Range of Feed. Automotive Industries, vol. 51, no. 15, Oct. 9, 1924, pp. 652–653, 4 figs. No. 1—A universal hollow hexagon turret lathe of Warner & Swasey Co. is featured by all-steel geared head, increased number and range of feeds and feed control in carriage aprons.

LEAD ALLOYS

Lead-Antimony. Grain Growth in Lead Containing One Per Cent of Antimony, R. S. Dean and W. E. Hudson. Am. Chem. Soc.—Jl., vol. 46, no. 8, Aug. 1924, pp. 1778–1786, 5 figs. Discussion of mechanism of grain growth as indicated by results of investigation of relations of time, temperature and amount of deformation to grain size.

LIGNITE

Char. Ignition Temperature of Some Lignite Char (Entzündungstemperaturen einiger Braunkohlengruden), A. Faber. Braunkohle, vol. 23, no. 22, Aug. 30, 1924, pp. 430–432. Results of experiments to determine temperature of spontaneous combustion of four kinds of char.

LOCOMOTIVE BOILERS

Boiler-Sheet Flanging Machine. Cold Flanging of Locomotive Boiler Sheets. Boiler Maker, vol. 24, no. 8, Aug. 1924, pp. 232–233, 9 figs. Outline of work of pneumatic flanging machine developed to speed up sheet-metal production.

Repairing, Pneumatic Tools for. Using Compressed-Air Tools in Locomotive-Boiler Repairs (Die Verwendung von Pressluftwerkzeugen in der Eisenbahn-Lokomotivkessel-Reparatur), E. Pallas. Maschinenbau, vol. 3, no. 23, Sept. 11, 1924, pp. 859–863, 9 figs. Describes most recent pneumatic tools and their construction, and application in removing boiler tubes and rivets, repairing tubes, thread cutting, etc.

LOCOMOTIVES

Baldwin. Baldwin Locomotives for the Madras & Southern Mahratta Railway. Ry. Gaz., vol. 41, no. 10, Sept. 5, 1924, p. 314, 2 figs. Describes 4–6–2 and 2–8–2 type locomotives built by Baldwin Locomotive Co. for Madras & Southern Mahratta Ry.; "Pacific" and "Mikado"-type engines are built to large proportions for working heavy express passenger and freight trains on 5-ft. 6-in. gage.

Cabs, Temperatures in. Temperatures in Cabs of Freight Locomotives Passing through Tunnels of the Chesapeake & Ohio Railroad, S. H. Katz and E. G. Meiter. Ry. & Locomotive Eng., vol. 37, no. 9, Sept. 1924, pp. 264–268, 3 figs. Gives results of tests and investigations conducted by Bur. of Mines in tunnels of Chesapeake & Ohio Ry. to improve conditions of temperatures in cabs of freight locomotives.

Coaling Plants. Recent Plants for Coaling Locomotives (Einige neuzeitliche Lokomotiv-Bekohlungsanlagen), B. Garlepp. Maschinenbau, vol. 3, no. 24, Sept. 22, 1924, pp. 890–894, 10 figs. Describes cranes, movable bunkers, etc., for stations of a daily capacity of up to 300–400 tons coal; track arrangement, coal stacks, etc.

Condensing. Reciprocating Steam Locomotives With Condensation (Die Kolbendampfmaschinen-Lokomotive mit Kondensation), K. Pfaff. Zeit. des Vereines deutscher Ingenieure, vol. 68, no. 30, Sept. 20, 1924, pp. 997–1003, 18 figs. Discusses effect of condensation by means of diagrams and shows that a superheated-steam condensing locomotive does about double the work of a saturated-steam locomotive of same heating surface, i.e., same fuel consumption.

Cylinders, Machining. Machining of Locomotive Cylinders and Valve Liners (Bearbeitung von Locomotivzylindern und Kolbenschieberbüchsen), E. Trebi. Werkstattstechnik, vol. 18, no. 18, Sept. 15, 1924, pp. 489–492, 12 figs. Details of drilling and milling machines of various types.

Decapod. Tests of Decapod Show 14 Per Cent Fuel Saving. Ry. Age, vol. 77, no. 15, Oct. 11, 1924, pp. 635–638, 12 figs. Abstract of report in Bul. No. 32 (copyright 1924 by Pa. R. R.), giving results of test plant trials; latest Pennsylvania class I1 locomotives show expected economy with short cut-off.

Design. New Locomotive Construction (Neue Wege im Lokomotivbau), F. Meineke. Zeit. des Vereines deutscher Ingenieure, vol. 68, no. 37, Sept. 13, 1924, pp. 937–942, 13 fig. Discusses increased pressure and temperature for more economic working, Krupp turbo-locomotives, Diesel locomotives, 1200-hp. Diesel-electric locomotives of Russian State Railways, operating Diesel locomotives with hydrogen, etc.

Diesel-Engined. German Diesel Locomotives, F. Meineke. Eng. Progress, vol. 5, no. 9, Sept. 1924, pp. 167–170, 8 figs. States that several locomotives with Diesel engines are being built in Germany, representing very remarkable solutions of problem; describes different types.

Electric. See ELECTRIC LOCOMOTIVES.

Freight. I D Superheated Freight Locomotives for Servia (I D-Heissdampf-Güterzug-Lokomotiven für Serbien), W. Franke. Glasers Annalen, vol. 95, no. 4, Aug. 15, 1924, pp. 51–56, 12 figs. Design, construction and equipment of locomotives built by Linke-Hofmann Works, capable of pulling train of 420 tons at 35 km. per hr.

Garratt. The Latest Garratt Locomotive Development. Ry. Gaz., vol. 41, no. 19, Sept. 26, 1924, pp. 408–409, 2 figs. Engine, constructed for Burma railways, is first of its kind to be constructed with eight coupled wheels, and is reputed to be largest locomotive yet constructed for meter gage.

Lubrication. Lubrication and its Effect on Locomotive Service. Ry. Age, vol. 77, no. 13, Sept. 27, 1924, pp. 558–561. Value of specific gravity and viscosity tests questioned; cylinder oil must be atomized; direct feed to cylinders unnecessary; friction and temperature tests with different oils; etc. Paper read at Traveling Engrs.' Assn.

Mallet. Brotan Boiler Applied to Hungarian Mallet. Ry. Mech. Engr., vol. 98, no. 10, Oct. 1924, pp. 583–586, 4 figs. Describes locomotive designed to handle traffic on Fiume-Moravica section of Budapest-Fiume line on Hungarian State Railways; weight 241,000 lb.; 220 lb. steam pressure.

Mixed-Traffic. New Mixed-Traffic Locomotives for the Great Southern & Western Railway, Ireland. Ry. Engr., vol. 45, no. 537, Oct. 1924, pp. 345–348, 8 figs. Tests made with first of series have proved adaptability of class for handling fast passenger trains, although primarily built for freight traffic.

Mountain Type. Central of Georgia Ry. Mountain Type Passenger Locomotives. Ry. Rev., vol. 75, no. 13, Sept. 27, 1924, pp. 457–460, 4 figs. New 4–8–2 type passenger locomotive constructed by Am. Locomotive Co. for handling heavy passenger trains; equipped with Nicholson thermic siphons.

Parts Testing. Production and Testing in Locomotive Construction (Fabrikations- und Prüfvorrichtungen im Locomotivbau). Werkstattstechnik, vol. 18, no. 18, Sept. 15, 1924, pp. 492–495, 11 figs. Details of methods followed by Linke-Hofmann works in Breslau for finishing and testing crossheads and guides.

Pennsylvania Ry., Development on. Motive Power Development, Pennsylvania Railroad System, P. T. Warner. Baldwin Locomotives, vol. 2, no. 4 and vol. 3, nos. 1 and 2, Apr., July and Oct. 1924, pp. 3–26, 33–57 and 3–29, 162 figs. Apr.: Traces development of power up to year 1868, when standard locomotive designs were adopted. July: Covers period 1868 to 1899, in which year Pennsylvania adopted Atlantic type for fast passenger service. Oct.: Discusses development from 1899 to present time.

Santa Fe. Santa Fe Locomotives, Canadian National Railway. Can. Ry. & Mar. World, no. 320, Oct. 1924, pp. 487–489, 4 figs. Built for heavy transfer service at Toronto, to operate between Mimico and Danforth; designated as T-t-a class; total weight, without tender, 409,000 lb.

Starter. Street Locomotive Starter. Ry. Rev., vol. 75, no. 14, Oct. 4, 1924, pp. 518–521, 6 figs. New type of locomotive starter, or booster, developed by C. F. Street, Greenwich, Conn.

Steam-Turbine. The First German Turbine Locomotive, R. Lorenz. Eng. Progress, vol. 5, no. 9, Sept. 1924, pp. 165–166, 5 figs. Describes condensing turbine locomotive built in Germany by firm of F. Krupp, Essen; author states that introduction of steam turbines to drive locomotives would save railways 20 to 30 per cent of coal now consumed.

The First Krupp Turbine Locomotives (Die erste Kruppsche Turbinenlokomotive), R. Lorenz. Kruppsche Monatschefte, vol. 5, Aug.-Sept. 1924, pp. 129–136, 8 figs. Details of construction, bearings and lubrication, condensers, feedwater heaters, Schmidt superheaters, ventilators, etc.

Superheaters for. See SUPERHEATERS.

Switching. Light-Weight Locomotives for Shunting Purposes. Indian & Eastern Engr., vol. 55, no. 1, July 1924, pp. 18–19, 3 figs. Discusses extended use of gasoline locomotive in classification yards; engine is of four-cycle internal-combustion type, having four water-jacketed cylinders (bore, 120 mm., stroke 140 mm.) and developing 40 hp. at 1000 r.p.m.

Tenders. Exhaust-Steam-Driven Tenders with Piston Locomotives (Abdampftriebtender bei Kolbenlokomotiven), R. P. Wagner. Organ für die Fortschritte des Eisenbahnwesens, vol. 79, no. 7, July 15, 1924, pp. 141–144. Discusses tender fitted with engine using exhaust steam of piston engine, and gives details of equipment and operation.

Uniflow. A Unaflow Locomotive is Built for Russia, J. Stumpf. Ry. Mech. Engr., vol. 98, no. 9, Sept. 1924, pp. 517–521, 8 figs. Describes 0–10–0 type locomotive built by Nydquist & Holm, Trollhättan, Sweden, for Russian government; equipped with a Walschaert valve gear. A remarkably high vacuum has been obtained by redesigning cylinder exhaust pipes. See also Ry. Age, vol. 77, no. 8, Aug. 23, 1924, pp. 327–331, 8 figs.

Valve-Gear Setting. Helpful Suggestions for Setting Valve Gear, H. W. Stowell. Ry. Mech. Engr., vol. 98, no. 10, Oct. 1924, pp. 596–597, 1 fig. Simple formulas used to obtain correct alterations for eccentric rods and valve rods.

Venezuela R. R. Locomotives of the Great Venezuelan Railroad (Die Lokomotiven der Grossen Venezuela-Eisenbahn (Südamerika)), E. Neuhaus. Organ für die Fortschritte des Eisenbahnwesens, vol. 79, no. 6, June 15, 1924, pp. 129–132, 7 figs. Design, construction and equipment of various types of locomotives for Caracas-Valenzia line.

LUBRICATING OILS

Manufacture. How Oil Companies Manufacture Industrial Lubricants, W. Miller. Eng. Wld., vol. 25, no. 3, Sept. 1924, pp. 169–171, 3 figs. Outlines modern processes of manufacturing lubricating oils; Abstract of paper read before Nat. Assn. Purchasing Agents.

Testing. Testing Lubricating Oils (Ueber die Prüfung von Schmierölen), G. Spettmann. Praktische Maschinen-Konstrukteur, vol. 57, no. 28, July 29, 1924, pp. 399–400. Discusses importance of testing; describes methods of testing; chemico-physical tests for classification of oils, mechanical for determining lubricating value; temperature measurement of bearings.

LUBRICATION

Essentials. The Essentials of Lubricating Engineering, A. F. Brewer. Indus. Mtg. (N. Y.), vol. 68, no. 3, Sept. 1924, pp. 145–151, 9 figs. How to minimize depreciation of expensive machinery.

Railway Motors. The Importance of Efficient Lubrication of Railway Motors, C. Bethel. Elec. Jl., vol. 21, no. 10, Oct. 1924, pp. 467–472, 9 figs. Outlines results of recent tests made to determine main factors affecting operation of waste-packed bearings; tests were conducted both in laboratory and in service.

M

MACHINE TOOLS

Wembley Exhibition. The Machine Tool Exhibition. Eng. Production, vol. 7, no. 144, Sept. 1924, pp. 257–267, 24 figs. Describes and illustrates important exhibits; high-speed side-planing machine, girder radial drilling machine, vertical drilling machine, high-power universal milling machine, turret lathe with covered bed, slot milling machine, bench drill, etc.

MACHINING METHODS

Automobile-Engine Parts. Pierce-Arrow Machining Processes, J. Younger. Am. Mach., vol. 61, no. 15, Oct. 9, 1924, pp. 571–573, 10 figs. Account of major operations on latest product of Pierce-Arrow plant, the model 80 car.

MALLEABLE CASTINGS

Manufacture and Properties. Malleable Castings. Eng. Production, vol. 7, no. 145, Oct. 1924, pp. 311–312, 1 fig. Notes on their properties and manufacture.

MALLEABLE IRON

Production in Short Annealing Periods. Possibilities of Producing Malleable Iron and Intermediate Products of Value in Short Annealing Periods, A. Hayes and W. J. Diederichs. Am. Soc. Steel Treating—Trans., vol. 6, no. 4, Oct. 1924, pp. 491–498, 5 figs. Outlines laboratory methods for producing malleable iron in 31 hours or less and for producing intermediate products of desirable physical properties; relations between method of treatment, microscopic structures and physical properties. Photomicrographs.

MATERIALS HANDLING

Automobile Manufacturing Plants. Material Handling as Our Key to Many Savings, M. R. Denison. Factory, vol. 33, nos. 1 and 2, July and Aug., 1924, pp. 30–33, 60, 62, 64, 66, 68, 70, 72, 74, 76, 78, 80, 82, 84 and 86; and 190–193 and 242–246, 27 figs. Important economies in labor, in inventory, and in floor space that have come out of material-handling methods at Studebaker plant. Details of methods.

Cement Industry. Handling 42,000,000 Tons of Raw Material a Year, L. N. Duryea. Mgt. & Administration, vol. 8, no. 1, July 1924, pp. 155–160, 11 figs. Mechanical conveying methods in cement industry.

Manufactured by Advertisers — CLASSIFIED LIST OF MECHANICAL EQUIPMENT — Alphabetical List on page 194

Mechanical Draft Apparatus
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(See Coils, Covering, Fittings, etc., Pipe)

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*Catalogue data of firms marked * appear in the A.S.M.E. Condensed Catalogues of Mechanical Equipment, 1924-25 Volume*

Glass Plants. Handling of Materials in Modern Glass Plant, D. M. Ewell. Eng. Wld., vol. 25, no. 3, Sept. 1924, pp. 157–161, 10 figs. Describes facilities at works of Owen Bottle Co., Charleston, W. Va. See also Belting, vol. 25, no. 3, Sept. 1924, pp. 48–54, 10 figs.

Metal-Working Plants. Handling Materials in Metal Working Plants. Can. Machy., vol. 32, no. 12, Sept. 18, 1924, pp. 29–33, 8 figs. Types of equipment; moving cars and materials; types of cranes.

METALS

Cleaning. Modern Methods of Cleaning Metals. Metal Industry (N. Y.), vol. 22, no. 10, Oct. 1924, pp. 402–404, 5 figs. How application of modern machinery and volume-production methods has lowered costs in metal-cleaning department and insured uniformly thorough work.

Corrosion. Notes on Corrosion Testing by Different Immersion Methods, H. S. Rawdon and A. I. Krynitsky. Am. Electrochem. Soc., Advance paper No. 20, for Mtg. Oct. 2–4, 1924, pp. 273–286, 5 figs. Need for choosing a corrosion test which shall in some measure approximate service conditions is emphasized and illustrated by reference to an unusual case of corrosion in a submarine cable. Describes general types of immersion tests. Comparative results of immersion tests on chromium steels. Pub. by permission U. S. Bur. Standards.

The Micro-Chemistry of Corrosion, C. H. Desch. Am. Electrochem. Soc., Advance paper No. 18, for Mtg. Oct. 2–4, 1924, pp. 251–256. Description of apparatus employed in a microscopical study of early stages of corrosion and of method of testing alloys.

Endurance. Correlation of Endurance Properties of Metals, D. J. McAdam, Jr. Am. Soc. Steel Treating—Trans., vol. 6, no. 3, Sept. 1924, pp. 393–395. Summary of paper presented by permission of Secretary of Navy.

Protection. Metal Protection (Metallschutz), E. Maass. Zeit. des Vereines deutscher Ingenieure, vol. 68, no. 34, Aug. 23, 1924, pp. 880–883. Reviews theories on corrosion of metals; corrosion of aluminum; processes for protecting metals; corrosion of condenser tubes.

Uses. The First Use of Metals, T. A. Rickard. Eng. & Min. Jl.—Press, vol. 117, nos. 13, 15 and 19, Mar. 29, Apr. 12 and May 10, 1924, pp. 528–530, 602–604 and 759–762. Early mining and metallurgical practice and uses of metals. Mar. 29: Gold and silver. Apr. 12: Copper and bronze. May 10: Iron, lead and zinc.

Work Hardness, Effect of Temperature on. Effect of Temperature on Work Hardening Metal, E. G. Herbert. Can. Machy., vol. 32, no. 8, Aug. 21, 1924, pp. 19–21, 12 figs. Experiments prove heat essential in some stamping operations, and that cutting tools increase durability at speeds which raise work to its critical temperature.

MOLDING MACHINES

Types. Types of Molding Machines, R. E. Search. Metal Industry (N. Y.), vol. 22, no. 10, Oct. 1924, pp. 397–398, 4 figs. Describes representative machines made in United States and abroad.

MONEL METAL

Welding. Welding Monel Metal. Can. Machy., vol. 32, no. 12, Sept. 18, 1924, pp. 39–40, 2 figs. Discusses precautions to be observed in welding of monel metal which are not ordinarily followed in welding steel.

MOTOR BUSES

Bodies. Developments in Motorbus-Body Design, H. G. Bersie. Soc. Automotive Engrs.—Jl., vol. 15, no. 4, Oct. 1924, pp. 346–351 and 358, 13 figs. Discussion of subject from viewpoint of passenger, as motor bus approaches him, as he enters it and as he judges quality of transportation it affords.

California. Some Notes on Automobile Stages in California, F. D. Howell. Soc. Automotive Engrs.—Jl., vol. 15, no. 4, Oct. 1924, pp. 292–299, 19 figs. Evolution of motor-carrier industry; types of service; requirements for stage and motor-bus service; mechanical features.

Operation and Maintenance. The Operation and Maintenance of the Motorbus, J. B. Stewart, Jr. Soc. Automotive Engrs.—Jl., vol. 15, no. 4, Oct. 1924, pp. 311–316, 1 fig. Discusses use in inter-city service, selection of motor bus or motor coach, brake rigging, repairs and replacements, use of anti-skid devices, reinforced cross-links, overcoming disadvantages of pit, and ventilation.

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Relation of Producer and Consumer. The Relation of the Vehicle Builder to Motor Transport, D. Beecroft. Soc. Automotive Engrs.—Jl., vol. 14, no. 5, May 1924, pp. 522–525 and (discussion) 525–526 and 538. Motor trucks, motor cars and motor buses used wholly for business purposes are considered by author in his plea for more clearly defined relations between producer and consumer. Paper is largely a presentation of view engineer must take of the situation. Dollar-earning fundamental is reason for author's consideration of subject.

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OIL ENGINES

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High-Compression. The Functioning of High Compression Oil Engines, Johnstone Taylor. Gas & Oil Power, vol. 20, no. 229, Oct. 2, 1924, pp. 1–2. With special reference to injection and combustion of fuel.

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Boiler Preparation for. Preparing Boiler for Oil Burning, G. Spencer. Plumbers Trade Jl., vol. 77, no. 6, Sept. 15, 1924, pp. 492–493, 4 figs. Discusses arranging and setting refractory linings and baffles, etc.

Central Heating with. Oil Fuel for Central Heating, A. F. Baillie. Domestic Eng. (Lond.), vol. 44, no. 8, Aug. 1924, pp. 167–171. Advantages and disadvantages of oil fuel, relative costs compared with coke, amount and different methods of storage, specific heat of oil and amount of heating surface required, frictional loss in pumping through pipes, etc.

Fire Prevention. Petroleum (Il petrolio), C. E. Della Chiesa. Industria, vol. 38, no. 15, Aug. 15, 1924, pp. 422–424. Discusses its use as substitute for coal in steam boilers, its advantages, means for preventing oil from taking fire and for extinguishing fires.

Flash Point. The Flash Point of Fuel Oil. Mar. Eng., vol. 29, no. 10, Oct. 1924, pp. 596–598. Résumé of U. S. Navy's investigations; heating and pumping tests; temperatures at which inflammable gases form; conclusions.

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Design. Some Recent Developments in Open-Hearth Steel Practice, G. A. V. Russell. Iron & Coal Trades Rev., vol. 109, no. 2944, Aug. 1, 1924, pp. 197–198. Discusses limitations of furnace charges; furnace hearths, coke-oven gas; mixed gases, thermal efficiency, furnace regenerators, furnace construction, etc. Abstract of paper read before Yorkshire Assn. of Instn. Civil Engrs.

Sulphur Absorption from Gas. Absorption of Sulphur from Gas of Siemens-Martin Furnace (Die Aufnahme des Schwefels aus dem Heizgas im Siemens-Martin-Ofen), A. Jung. Berichte der Fachausschüsse des Vereins deutscher Eisenhüttenleute (Stahlwerksausschuss), no. 83, Apr. 11, 1924, 4 pp. Discusses sulphur content of briquets, coal, generator gas and gas-producer slag; effect of steam addition to gas producer; relation between sulphur content of gas and of ingot.

OXY-ACETYLENE CUTTING

Cutting Tips, Manufacture of. Making Oxy-acetylene Cutting Tips. Machy. (Lond.), vol. 24, no. 626, Sept. 25, 1924, pp. 838–840, 6 figs. Cost-reducing methods used in manufacturing cutting tips for oxy-acetylene outfits.

OXY-ACETYLENE WELDING

Automobile Bodies. All-Steel Automobile Bodies, J. W. Meadowcroft. Welding Engr., vol. 9, no. 9, Sept. 1924, p. 24. Discusses oxy-acetylene, electric and other processes used; many advantages claimed for all-welded bodies; lightness, strength and smooth finish.

Plumbing and Heating Work. Welding in Plumbing and Heating, H. E. Wetzell. Welding Engr., vol. 9, no. 8, Aug. 1924, pp. 17–18, 3 figs. Work done in place with oxy-acetylene cutting and welding; joints, connections and special fittings economically welded.

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The Drying of Peat for Power Production, G. K. Fletcher. World Power, vol. 2, no. 9, Sept. 1924, pp. 156–163. Considers possibilities of using peat for purposes of power production.

Preparation and Briquetting. New Process of Preparing and Briquetting Peat, R. Schade. Iron & Coal Trades Rev., vol. 109, no. 2952, Sept. 26, 1924, p. 520. Outlines new German method of peat preparation, by which not only water in peat, but also sugar contained in it, are separated.

PHOTOELASTICITY

Gear Stresses, Analysis of. The Photoelastic Method for the Determination of Causes of Failure of Metal Structures, P. Heymans, G. R. Brophy and A. L. Kimball, Jr. Am. Soc. Steel Treating—Trans., vol. 6, no. 4, Oct. 1924, pp. 506–514, 12 figs. Results obtained through scientific study of stresses set up in metal structures, resulting from design and method of installation or assembly; investigation applied specifically to study of pinion gears; as result of photoelastic method of analysis, predictions as to form of failures were made and then substantiated by actual tests with steel gears.

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Modern Methods of Pipe Manufacture by the Centrifugal Process, E. J. Fox and P. H. Wilson. Iron & Coal Trades Rev., vol. 109, no. 2948, Aug. 29, 1924, pp. 344–346, 8 figs. Discusses process details, process of centrifugally casting, and output of centrifugal machines, giving comparative data.

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Manufacture. Piston-rings and their Production, J. McIntosh. Machy. (N. Y.), vol. 31, no. 2, Oct. 1924, pp. 93–94, 1 fig. Methods of machining, finishing, testing, facing sides, and grinding outside diameter.

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Hydraulic. Hydraulic Presses in the Rubber Industry (Hydraulische Pressen in der Gummi verarbeitenden Industrie), C. Walther. Gummi-Zeitung, vol. 38, no. 43, July 25, 1924, pp. 878–881, 10 figs. Design and construction of presses used in production of hollow bodies.

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Advantages. Advantages in Burning Pulverized Coal, F. L. Wolf. Steam Coal Buyer, vol. 2, no. 2, Sept. 1924, pp. 22 and 24, 1 fig. Practical description showing why pulverized coal gives more perfect combustion, with figures on comparative costs.

Boiler Firing. Powdered Coal for Small Boiler Plants, T. W. Atterbury. Power Plant Eng., vol. 28, nos. 18, 19 and 20, Sept. 15, Oct. 1 and 15, 1924, pp. 937–939, 996–999 and 1048–1050, 12 figs. Describes unit pulverizer method of pulverizing and firing; system makes powdered coal an economical fuel for plant with few boilers. Analysis of operating costs. Comparative advantages and desirable characteristics of unit pulverizer.

Boiler Performance. Pulverized-Coal Boiler Performance, Brunot Island Power Station, L. W. Heller. Power, vol. 60, no. 16, Oct. 14, 1924, pp. 600–603, 9 figs. States that 22 months of operation has shown that this method of burning Pittsburgh coal has operat-

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R

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British Railways. The Future of Main-Line Electrification on British Railways, H. E. O'Brien. Instn. Elec. Engrs.—Jl., vol. 62, no. 333, Sept. 1924, pp. 729–755 and (discussion) 755–781, 9 figs. Shows that probable density of traffic in ton-miles on main railway arteries is so great that cost of energy, including all capital charges, will not be prohibitive, also that cost of electric locomotives will not be a capital charge, and that when reductions in cost of locomotive operation and maintenance (due to simple construction of electric locomotive) are taken into account, total cost of locomotive operation is substantially less for electricity than for steam.

Europe. The Electrification of Foreign Railways, Including Recent Developments and Projects, S. P. Smith. World Power, vol. 2, nos. 1, 2 and 4, Jan., Feb. and Apr. 1924, pp. 44–51, 111–116 and 216–223, 4 figs. Jan.: Germany. Feb.: Austria and Hungary. Apr.: France and Holland.

Spain. The 3000-volt Electrification of the Spanish Northern Railway, A. I. Totten and H. C. Hutchinson. Gen. Elec. Rev., vol. 27, no. 10, Oct. 1924, pp. 658–664, 11 figs. Section between Ujo and Busdongo now being electrified as initial step of extensive program. Describes this most recent substitution of electric locomotives for steam locomotives, locomotives themselves, motors, control, auxiliary equipment, substations, transformers, motor-generator sets, and overhead line construction.

United States. The Electrification of Railways in United States, Including Recent Developments and Projects, S. P. Smith. World Power, vol. 2, nos. 6 and 7, June and July 1924, pp. 338–346 and 38–44, 6 figs. Deals with roads electrified in America.

RAILWAY MOTOR CARS

Gasoline. The Gasoline Railroad-Car for Branch Lines, W. L. Bean. Soc. Automotive Engrs.—Jl., vol. 15, no. 4, Oct. 1924, pp. 306–310, 7 figs. Discusses principal factors of design. Weight-space and weight-power ratios of prime importance. Transmission systems compared. See also Ry. Age, vol. 77, no. 13, Sept. 27, 1924, pp. 535–539, 6 figs.

Gasoline-Electric. The Gasoline-Electric Car, A. H. Candee. Elec. Jl., vol. 21, no. 10, Oct. 1924, pp. 481–483, 4 figs. Discussed possibilities and developments.

Operation. Motor Rail-Cars, J. W. Cain. Soc. Automotive Engrs.-Jl., vol. 15, no. 4, Oct. 1924, pp. 317–319. Ascribes limited success of McKeen gasoline-driven car and one of the gasoline-electric type that were introduced in early part of present century and were pioneers among self-propelled cars for railway use, to their excessive weight and to engine and transmission troubles. Present state of industry. Advantages of motorization.

Types. Motor Coaches for Railways, G. Soberski. Eng. Progress, vol. 5, no. 9, Sept. 1924, pp. 175–182, 23 figs. Development of railway motor cars; modern types—their advantages and disadvantages.

RAILWAY OPERATION

Cinders Disposal. Report on the Handling and Disposing of Cinders. Ry. Eng. & Maintenance, vol. 20, no. 10, Oct. 1924, pp. 402–404. Discusses track layout and equipment for wasting; committee recommends more extensive use of cinders as ballast; equipment for handling direct from pit to point of use; storage of cinders. Committee report of Roadmasters & Maintenance of Way Assn.

Freight-Train Loading. Maximum Loading of Freight Trains. Ry. & Locomotive Eng., vol. 37, no. 9, Sept. 1924, pp. 278–280. Computing adjusted tonnage ratings for maximum freight-train loads.

Passenger-Train Handling. The Smooth Handling of Passenger Trains, E. R. Boa. Central Ry. Club—Official Proc., vol. 32, no. 4, Sept. 1924, pp. 1605–1609 and (discussion) 1609–1627. Discusses phases that are contributing factors and outlines manner in which air brake, throttle, and reverse gear should be manipulated to insure smooth train handling.

Psychology in. Psychology in Railway Operation (Ueber Psychologie und Eisenbahnwesen), K. Marbe. Archiv für Eisenbahnwesen, no. 5, Sept.-Oct. 1924, pp. 729–744. Paper read before psycho-technic committee of German Railways, discussing psychology in relation to train operation; accident prevention, change in work to relieve monotony; etc.

Time Tables. Instructions for Determining the Schedule Times for Trains by the Graphic Method (Anweisungen für die Ermittlung der Fahrzeiten der Züge nach den zeichnerischen Verfahren), M. Dittmann. Organ für die Fortschritte des Eisenbahnwesens, vol. 79, no. 6, June 15, 1924, pp. 117–129, 8 figs. Gives details of five different methods for given line and given locomotive and weight of train.

Train Control. A Continuous Conductive System of Train Control. Ry. Rev., vol. 75, no. 14, Oct. 4, 1924, pp. 501–504, 1 fig. Clifford system of automatic train control gives continuous indication two blocks in advance of danger condition.

Economic Advantages of Automatic Train Control, Jos. Beaumont. Ry. Rev., vol. 75, no. 14, Oct. 4, 1924, pp. 507–508. Information on direct saving which accrued by elimination of train stops on Chicago Rock Island & Pac. Ry.; analysis of economic value of automatic train control.

Pennsylvania's Experience with Automatic Stops, A. H. Rudd. Ry. Age, vol. 77, no. 15, Oct. 11, 1924, pp. 645–646. Value of cab signal; effect on track capacity; conclusions. (Abstract.) Paper read before Am. Ry. Assn. See also Ry. Signaling, vol 17, no. 10, Oct. 1924, pp. 391–393.

The Miller Train Control on the C. & E. I., H. H. Orr. Ry. Signaling, vol. 17, no. 10, Oct. 1924, pp. 393–394. Improved design in service since 1914; maintenance separated between signal and motive power.

Train Control Development on the C. & O., B. T. Anderson. Ry. Signaling, vol. 17, no. 10, Oct. 1924, pp. 394–397. Features of first installation; new features of a.c. system; failure of automatic-train-control devices; train-control organization; effect on track capacity; interchangeability.

RAILWAY REPAIR SHOPS

Box Cars, Rebuilding. Time Record in Rebuilding Box Cars, A. C. L. R. R., O. A. Wallace. Ry. Rev., vol. 75, no. 15, Oct. 11, 1924, pp. 533–537, 13 figs. Voluntary contest originated in four system shops demonstrates advantages obtained in progressive repair system.

Car-Repair Billing. A. R. A. Car Repair Billing, B. F. Jamison. Ry. Mech. Engr., vol. 98, no. 10, Oct. 1924, pp. 610–613. Points out possibilities of individual roads saving, and conversely losing, probably millions of dollars depending upon whether or not they handle A. R. A. billing in a systematic manner in accordance with rules, employing constant checks of all kinds to maintain accuracy of work. Requirements of the various persons who have responsibility of executing system of car-repair billing. Handling of accident reports. Abstract of paper read at Chief Interchange Car Inspectors' and Car Foremen's Assn. of Am.

Drypipes. The Inside and Outside Drypipe. Ry. & Locomotive Eng., vol. 37, no. 9, Sept. 1924, pp. 261–264, 6 figs. Describes method of repairing drypipe leakage.

Locomotives. Locomotive Repairs in New Burlington-Denver Shops, H. Campbell. Am. Mach., vol. 61, nos. 12 and 14, Sept. 18 and Oct. 2, 1924, pp. 447–450 and 531–533, 19 figs. New shops of C. B. & Q. R. R. near Utah Junction, Denver, Col., now in operation. Time-saving and cost-lowering tools and fixtures. Details as to special tools and methods.

Tool Shops. Central Tool Makers' Shops in Railway Repair Works (Zentrale Werkzeugmacherei eines Eisenbahn-Ausbesserungswerkes), M. Boehme. Glasers Annalen, vol. 95, no. 3, Aug. 1, 1924, pp. 37–40, 4 figs. Shows layout of shop and machine tools, stores and tools for turning wheels and tires, etc.

RAILWAY SHOPS

Locomotive Cylinder Shop. A Modern Locomotive Cylinder Shop, E. A. Custer. Baldwin Locomotives, vol. 3, no. 2, Oct. 1924, pp. 45–53, 10 figs. Describes method of machining locomotive cylinders; gives design and equipment of plant of Baldwin Locomotive Works, Eddystone plant.

Micrometers, Application of. Application of Micrometers in Railway Shops, M. H. Williams. Ry. Mech. Engr., vol. 98, no. 10, Oct. 1924, pp. 615–618, 7 figs. Interchangeability of pins and bushings for valve motion is made possible by use of micrometers.

Stores Methods in. Store Methods on the Norfolk & Western, J. W. Wade. Ry. Age, vol. 77, no. 14, Oct. 4, 1924, pp. 605–608, 8 figs. Particulars of new stores-department methods which have brought about a large reduction in material investment.

RAILWAY SIGNALING

Automatic, for Rapid Transit. The Automatic Signal System of the Berlin Electric Rapid Transit Railways, G. Kemmann. Eng. Progress, vol. 5, no. 9, Sept. 1924, pp. 191–197, 9 figs. Development of automatic signal system—its extent in Berlin and its performance.

Interlocking. New Low-Voltage Interlocking on the Delaware & Hudson, A. H. Rice. Ry. Signaling, vol. 17, no. 10, Oct. 1924, pp. 375–377, 6 figs. Points out that remote control of switches and signals, in connection with new coaling plant, permits high-speed movements.

RAILWAY TRACK

Crossings. Grade Crossings as a Municipal Engineering Problem. Eng. News-Rec., vol. 93, no. 15, Oct. 9, 1924, pp. 579–581. Brief review of present and prospective conditions in a number of cities in United States. Track elevation usual method.

Standard Formulae for Calculating Point and Crossing Dimensions, R. D. Walker. Ry. Engr., vol. 45, no. 537, Oct. 1924, pp. 339–340, 4 figs. Problems illustrating use of standard formulas as given for four methods, and more difficult problems.

Maintenance, Germany. Aims in Management of German Permanent Way (Neuere Ziele der Bewirtschaftung des deutschen Oberbaues), Kurth. Zeit. des Vereines deutscher Ingenieure, vol. 68, no. 30, Sept. 20, 1924, pp. 994–996. Discusses initial cost and maintenance, track laying, training of operators, care of track and ties, etc.

Turntables. New 85-Ft. Diameter Locomotive Turntables for the Bombay Baroda & Central India Railway Company. Ry. Gaz., vol. 41, no. 10, Sept. 5, 1924, pp. 310–311, 4 figs. Turntable has diameter of 85 ft. and is designed for 5 ft. 6 in.-gage locomotives weighing up to 200 tons; deck type with central balance.

REFRACTORIES

Carborundum. Physical Characteristics of Specialized Refractories—Part V: Thermal Conductivity of Carborundum Refractories, M. L. Hartmann and O. B. Westmont. Am. Electrochem. Soc., Advance paper No. 21, for Mtg. Oct. 2–4, 1924, pp. 287–312, 13 figs. Details of tests made.

Sillimanite. Preparation of Artificial Sillimanite for Refractory Uses, C. E. Sims, H. Wilson and H. C. Fisher. Am. Electrochem Soc., Advance paper No. 22, for Mtg. Oct. 2–4, 1924, pp. 327–343, 8 figs. partly on supp. plates. Describes experimental work leading to adoption of a furnace for preparation of artificial sillimanite. Raw materials, and characteristics.

REFRIGERANTS

Organic Brines. Organic Refrigerating Brines, H. F. Zoller. Indus. & Eng. Chem., vol. 16, no. 10, Oct. 1924, pp. 1073–1075, 1 fig. Deals with non-aqueous and aqueous brines; factors affecting choice of brine; advantages of alcohol-water mixture; summarizes advantages of certain organic refrigerating brines of methyl-ethyl alcohol or glycerol type over inorganic chloride brines.

Properties. Properties of Refrigerants, H. D. Edwards. Refrig. Eng., vol. 11, no. 3, Sept. 1924, pp. 95–116, 20 figs. Report containing data on physical properties, effect on various lubricants, effect on human life or health, inflammability, explosive qualities, method of testing purity, precautions essential in handling, etc.

REFRIGERATING MACHINES

Absorption. The Absorption Ice Machine, H. A. Cranford. Southern Engr., vol. 41, no. 2, Apr. 1924, pp. 57–59, 1 fig. What to do when overhauling the system and how to handle the various apparatus.

RIVETING

Machines, Electrically Driven. Application of Work-Regulating Drive in Hydraulic Machines (Die Anwendung des Arbeitsreglerantriebes bei hydraulischen Maschinen), P. Hohnen. Maschinenbau, vol. 3, no. 23, Sept. 11, 1924, pp. 850–852, 3 figs. Describes A. E. G. automatically regulated electric motor and compares a riveting plant driven by such a motor with one having hydraulic drive.

ROLLING MILLS

Adjustable-Speed Drives. Adjustable Speed Drives for Rolling Mills, L. A. Umansky. Iron & Steel Engr., vol. 1, no. 9, Sept. 1924, pp. 515–532, 27 figs. Discusses advantages to be derived from use of adjustable-speed drive, and necessary speed range and capacity; elementary cases of speed-regulation problems; comparison and selection of systems.

Electric Drive. The Bar Mill and Structural Mill Electrification of the Phoenix Iron Company, J. S. Erichson. Elec. Jl., vol. 21, no. 9, Sept. 1924, pp. 403–407, 9 figs. Details of conversion from steam to electric drive, which consists of 3000-hp. 600-volt, compound-wound, compensated, adjustable-speed d.c. motor, driving through herringbone-gear unit.

Electric Equipment of the Reversing Rolling Mill

Manufactured by Advertisers CLASSIFIED LIST OF MECHANICAL EQUIPMENT

Alphabetical List on page 194

Recorders, SO_2
* Tagliabue, C. J. Mfg. Co.
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(See Instruments, Recording)

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Foster Engineering Co.

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(See Counters, Revolution)

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(See Bearings, Roller)

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(See Dies, Thread Cutting)

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Union Drawn Steel Co

Steel, Chrome
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Steel, Chrome Nickel
Central Steel Co.

Steel, Chromium Alloy
Central Steel Co.

Steel, Cold Drawn
Union Drawn Steel Co.

Steel, Cold Rolled
Cumberland Steel Co.
Union Drawn Steel Co.

Steel, Hot Rolled
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*Catalogue data of firms marked * appear in the A.S.M.E. Condensed Catalogues of Mechanical Equipment, 1924-25 Volume*

at the Angleur Steel Works (L'équipement électrique du train réversible des Aciéries d'Angleur), M. Odier. Association des Ingénieurs Électriciens sorti de l'Institut Electrotechnique Montefiore—Bul., vol. 2, series 7, no. 6, June 1924, pp. 206–235, 21 figs. Discusses Ilgner patents and subsequent development of electric drive for reversible mills, its advantages in saving of power and upkeep, details of reversible motor, flywheel converter group, connections, etc.

Four-Roll System. Four-Roll System for Three High Mills (Das Vierwalzensystem für Triowalzwerke), H. Cramer. Berichte der Fachausschüsse des Vereins deutscher Eisenhüttenleute (Walzwerksausschuss), no. 34, Jan. 30, 1924, 4 pp., 4 figs. Blind passes and how to avoid them; using a second middle roll; accurate control of rolls; etc. See also Stahl u. Eisen, vol. 44, no. 39, Sept. 25, 1924, pp. 1170–1172, 2 figs.

Hot Beds. New Type of Mechanical Hot Bed. Iron Age, vol. 114, no. 16, Oct. 16, 1924, pp. 990–991, 4 figs. Elliptical moving members insure proper advance of rails, billets, etc, with less direct transfer of heat, in hot bed developed by W. McKee, which represents radical change from present type. See also Iron Trade Rev., vol. 75, no. 16, Oct. 16, 1924, pp. 1016–1017, 4 figs.

Power Consumption. Time Study and Measuring Power Consumption in Rolling Mills (Zeitstudien und Kraftverbrauchsmessungen im Walzwerk), G. Bulle. Berichte der Fachausschüsse des Vereins deutscher Eisenhüttenleute (Walzwerksausschuss), no. 35, Jan. 30, 1924, 5 pp., 5 figs. Discusses time tables for mill, recording power consumption, stop-watch records of operations, determination of weights rolled, training of workers, etc.

S

SAND, MOLDING

Bonding Substance of. The Bonding Substance of Molding Sands, H. B. Hanley. Am. Foundrymen's Assn.—Bul., vol. 3, no. 2, Apr. 1924, pp. 6–10. Its composition, properties and tests.

SCALES

Computing. The Development of the Modern Computing Scale. Can. Machy., vol. 32, no. 11, Sept. 11, 1924, pp. 19–22, 4 figs. Brief outline of evolution of methods of weighing from shekels of silver of 1860 B.C. to products of Dayton Scale Works, Toronto, in 1924.

SCREW THREADS

Rolled. Rolled Screw Threads (Ueber gerollte Schrauben), M. Heinig. Organ für die Fortschritte des Eisenbahnwesens, vol. 79, no. 6, June 15, 1924, pp. 132–133, 3 figs. Details of microstructure of cut and rolled screw threads, tensile strength, expansion and efficiency.

SEMI-DIESEL ENGINES

Deutz Marine. The Deutz Marine Semi-Diesel Engine (Der. Deutzer Schiffs-Semi-Dieselmotor). Motorwagen, vol. 27, no. 23, Aug. 20, 1924, pp. 408–411, 8 figs. Details of compressorless Diesel, its increased efficiency, smallest fuel consumption being 166 g. per hp. hr. at 320 effective hp.

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Lineshafting. Some Notes on Line Shafting, H. Seymour. World Power, vol. 2, no. 9, Sept. 1924, pp. 170–172. Discusses considerations in selecting lineshafting; erection of shafting; choice of couplings.

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Release of. Effect Produced by the Release of Springs (Les effets produits par la détente d'un ressort), C. Reynal. Arts et Métiers, vol. 77, no. 47, Aug. 1924, pp. 312–317, 6 figs. Discusses rectilinear and curvilinear motion of springs on release, velocity of release, and develops formulas for calculating forces exerted.

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German N. D. I. Reports. Report of the German Industrial Standards Committee (N. D. I.-Mitteilungen). Maschinenbau, vol. 3, no. 23, Sept. 11, 1924, pp. 875–880, 6 figs. Details of proposals for screws with conical square head and with point and hexagonal head; size of letters and figures for marking castings, etc.; colors for distinguishing pipe lines; forged flanges for shafts.

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Power and Process Work, Use for. Generating Mechanical Energy in Works Using Heating Steam. Sulzer Tech. Rev., no. 1, 1924, pp. 7–14, 10 figs. Discusses advantages of installing steam plant arranged for exhaust or extracted steam utilization in industrial plants; field of application of back-pressure engine; back-pressure engine working on conjunction with another power source; steam-extraction plant; Sulzer oil-operated steam-pressure regulator.

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Economic Operation. Efficiency in Steam Power Plant Operation, L. M. Arkley. Eng. Jl., vol. 7, no. 10, Oct. 1924, pp. 635–638, 2 figs. Discusses possibility of effecting economy in operation of steam plants; preparations for boiler tests; heat losses; Orsat apparatus; causes of low percentage of CO_2; summary of procedure to ascertain causes of low boiler efficiency; CO_2 recorders.

High-Pressure. High Pressure Steam at Weymouth, I. E. Moultrop. Stone & Webster Jl., vol. 35, no. 3, Sept. 1924, pp. 309–317, 3 figs. Gives detailed description of design and equipment of Weymouth power station of Edison Elec. Illuminating Co. of Boston, highest commercial steam power plant in world.

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Long-Bell Lumber Co., Wash. 18,000-kw. Plant Serves Lumber Company. Power, vol. 60, no. 17, Oct. 21, 1924, pp. 638–641, 5 figs. Long-Bell Lumber Co. operates its Longview (Washington) properties from its own central plant of 18,000-kw. present capacity; conveyor system delivers hogged fuel to Stirling-type boilers, provided with extension furnaces; ashes are removed by sluicing; electric drive is used extensively throughout plant.

Steel Works. Steel Company Builds New Power Plant. Power Plant Eng., vol. 28, no. 20, Oct. 15, 1924, pp. 1034–1041, 9 figs. Details of power plant of new blast furnace and coke plant of Columbia Steel Corp. at Provo, Utah; includes tabular data on equipment used.

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Economy, Conditions Affecting. Conditions Affecting Steam Turbine Economy, J. Y. Dahlstrand. Power Plant Eng., vol. 28, no. 20, Oct. 15, 1924, pp. 1041–1043, 1 fig. Outline of conditions which interfere with maintenance and high economy.

High-Pressure. Steam Boilers at Very High Pressure (Les machines à vapeur à très haute pression), A. Troller. Nature (Paris), no. 2618, June 7, 1924, pp. 364–368, 5 figs. Discusses Gennevilliers 45,000-hp. equipment, Brown Boveri high-pressure turbines and data, Blomquist boilers, etc.

What the World Power Conference Showed About Modern Steam Turbines and Their Design. Elec. Wld., vol. 84, no. 14, Oct. 4, 1924, pp. 737–740. Abstracts of four authoritative papers on high pressure showing general lines of development in Great Britain, Holland, Sweden and United States.

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STEEL

Carbon. Iron-Carbon Diagram and Most Important Structural Elements of Carbon Steels (Das Eisen-Kohlenstoff-Diagramm und die wichtigsten Gefügebestandteile der Kohlenstoffstähle), K. Daeves. Berichte der Fachausschüsse des Vereins deutscher Eisenhüttenleute (Werkstoffausschuss), no. 42, Apr. 4, 1924, 10 pp., 20 figs. Discusses critical points, significance of lines and points in diagram, changes in very rapid cooling and hardening, structural elements, etc.

Cutting-Tool. Influence of Ledeburite Structural Elements in the Production and Treatment of Cutting Steels (Der Einfluss der ledeburitischen Gefügebestandteile bei der Erzeugung und Behandlung von Dreh- und Schnittstählen), F. Rapatz. Berichte der Fachausschüsse des Vereins deutscher Eisenhüttenleute (Werkstoffausschuss), no. 41, Apr. 4, 1924, 7 pp., 13 figs. Details of ledeburite steels, composition and size of net structure, decrease of hardening capacity by overloading with alloy metals, effect of velocity of solidification, etc. See also Stahl u. Eisen, vol. 44, no. 38, Sept. 18, 1924, pp. 1133–1138, 2 figs.

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Macroscopic Examination. The Macroscopic Examination of Steel, V. O. Homerberg. Am. Soc. Steel Treating—Trans., vol. 6, no. 3, Sept. 1924, pp. 295–314, 30 figs. Explains manner in which segregation takes place in steel; method of preparing specimens; formulas of etching reagents, together with directions for their use and necessary precautions to be taken; macrographs are included to illustrate results obtained from use of these different reagents.

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Rivet. Effect of Sulfur on Endurance Properties of Rivet Steel. Am. Soc. for Testing Matls., Preprint No. 4a, for Mtg. June 24–27, 1924, 15 pp., 9 figs. Third preliminary report of Joint Committee on Investigation of Phosphorus and Sulphur in Steel. Describes endurance tests made at U. S. Naval Eng. Experiment Station, and results obtained.

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Spheroidized Cementite in Hypoeutectoid. Spheroidized Cementite in Hypoeutectoid Steel, R. S. MacPherran and J. F. Harper. Am. Soc. Steel Treating—Trans., vol. 6, no. 3, Sept. 1924, pp. 341–374, 20 figs. Results of authors' experience in method of heat treating large forgings; results obtained by spheroidization of cementite of pearlitic constituent seem to warrant treatment given; treatment applied to

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cast steel results in corresponding improvement of physical properties. Photomicrographs.

Stainless. Stainless Steel and Stainless Iron O. K. Parmiter. Am. Soc. Steel Treating—Trans., vol. 6, no. 3, Sept. 1924, pp. 315–340. Reviews history and development of stainless steel and stainless iron of 13 per cent chromium type; problems involved in manufacture of this material, its composition and effect of various elements upon it; heat treatment, forging, normalizing, annealing and hardening; physical properties; general properties of stainless steel; applications and possibilities of stainless iron.

Test Results. What is Steel? A. Sauveur. Min. & Metallurgy, vol. 5, no. 214, Oct. 1924, pp. 465–468, 2 figs. Notes on thermic curves of blast furnaces; epochal contributions of Henry M. Howe; results of tests on Armco iron; electrolytic iron; Norway iron; low-carbon steel; steel containing 0.30 per cent carbon. (Abstract.)

STEEL CASTINGS

Defects. Some Steel Foundry Experiences, H. V. Fell. Foundry Trade Jl., vol. 30, no. 422, Sept. 18, 1924, pp. 239–240, 19 figs. Describes a few steel castings which have been made by author and indicates their defects and means by which they were overcome.

Sink Heads. Proportioning and Shaping of Sink Heads, J. H. Hall. Iron Age, vol. 114, no. 14, Oct. 2, 1924, pp. 822–823. How not only a saving of metal can be secured, but a lowering of cost of steel, if proportioning and shaping of risers is carefully studied. Advantages of use of a comparatively new kind of riser which is cone shaped.

STEEL, HEAT TREATMENT OF

Annealing. Annealing of Plates Used in Electrical Construction (Le recuit des tôles utilisées dans la construction électrique), R. Cazaud. Revue de Métallurgie, vol. 21, no. 8, Aug. 1924, pp. 473–483, 18 figs. Requirements of thin sheets used in electric machines; effect of mechanical treatment on magnetic qualities; effect of temperature, silicon content, atmosphere, etc.

Railway Shops. Heat Treatment of Steel. Ry. Jl., vol. 30, no. 10, Oct. 1924, pp. 22–24, 3 figs. Deals with handling of different tools, heat treatment of same in tool-tempering room of Atchison, Topeka & Santa Fe shops at Topeka, Kan.

Quenching. Quenching Diagrams for Carbon Steels in Relation to Some Quenching Media for Heat Treatment, H. J. French and O. Z. Klopsch. Am. Soc. Steel Treating—Trans., vol. 6, no. 3, Sept. 1924, pp. 251–294, 22 figs. Gives quenching diagrams for carbon steels containing from 0.25 to 1.25 per cent carbon; in these are shown relations between Rockwell hardness, microstructure, thermal transformations and cooling velocity determined at 720 deg. cent.; general relations between quenching diagrams and various quenching media for heat treatment. Bibliography.

STEEL, HIGH-SPEED

Chromium in. The Nature of the Function of Chromium in High Speed Steel, E. C. Bain and M. A. Grossmann. Am. Soc. Steel Treating—Trans., vol. 6, no. 4, Oct. 1924, pp. 430–442, 17 figs. Results of measurement of effect of heat treatment upon hardness, impact strength and volume change in case of four high-tungsten steels; data, in some measure, reveal function of chromium in high-speed steel; photomicrographs show principal structural changes responsible for effect of heat treatment upon properties.

Hardness, Brinell and Rockwell. Comparison of Brinell and Rockwell Hardness of Hardened High Speed Steel, S. C. Spalding. Am. Soc. Steel Treating—Trans., vol. 6, no. 4, Oct. 1924, pp. 499–504, 6 figs. Steels were treated under varying temperatures and both Rockwell and Brinell hardness numbers were obtained; these are tabulated and shown in accompanying curves.

STEEL INDUSTRY

Central-Station Power for. Power Service for the Steel Industry in the Pittsburgh District, Chas. R. Riker. Elec. Jl., vol. 21, no. 9, Sept. 1924, pp. 442–445. Brief review of existing and potential relationship between central-station companies and steel industry.

STEEL MANUFACTURE

Ordnance Steel. The Manufacture of Ordnance Steel, J. B. Rhodes. Forging—Stamping—Heat Treating, vol. 10, no. 10, Oct. 1924, pp. 380–383. Points out that greatest steps in improving ordnance steels have been in heat treatment; freedom from cracks, flaws and microscopic inclusions essential. Paper read before Am. Iron & Steel Inst.

STEEL WORKS

Electrical Equipment, Application of. Electrical Engineering as a Leading Factor in the Development of Modern Steel works, W. Geyer. Iron & Coal Trades Rev., vol. 109, no. 2943, July 25, 1924, pp. 153–154. Discusses electric motors, cranes and transporters auxiliary machines, power production, compressed-air supply, rolling mills, steel production in electric furnaces. Abstract of paper read before World Power Conference.

Electrification of. The Rehabilitation of Steel Mills, J. M. Moore and H. M. McLain. Elec. Jl., vol. 21, no. 9, Sept. 1924, pp. 424–427, 7 figs. Points out advantages of electrification and necessity for formulating definite plan for rehabilitation of existing plant equipment.

Machine Tools in. Machine Tools and Their Auxiliaries in the Steel Mills, J. F. Kelly. Iron & Steel Engr., vol. 1, no. 9, Sept. 1924, pp. 466–482 and 536–544, 30 figs. Notes on selection of machine tools; history and development of tools; modern practice; reversing planers; gear-cutting machines; grinding machines; boring mills; radial drills; automatic control of machine tools; lubrication.

STOKERS

Steam Engine as Drive. The Steam Engine as a Stoker Drive. Power Plant Eng., vol. 28, no. 19, Oct. 1, 1924, pp. 1000–1002, 4 figs. Slow speed, continuous range and automatic torque-speed adjustment are among desirable characteristics.

STREET RAILWAYS

Car Materials. New Materials in Car Body Construction, J. A. Dewhurst. Elec. Ry. Jl., vol. 64, no. 14, Oct. 4, 1924, pp. 549–552, 5 figs. Points out that development of steel-covered laminated wood panels has made possible construction of type of side girder which has strength and rigidity of steel and at same time gives better insulation, less noise and reduced weight.

Electric Switches for. Electric Switches for Street Railways (Elektrische Weichenstellvorrichtungen für Strassenbahnen), E. Halle. Elektro-Jl., vol. 4, no. 6, June 1924, pp. 166–168, 7 figs. Design and construction of Schwinge and double-magnet types of locking frames made by AEG.

Noise Elimination. Elimination of Noise, C. L. Van. Auken. Elec. Traction, vol. 20, no. 9, Sept. 1924, pp. 405–412, 13 figs. Deals with track, wheel, wheel and track, journal, brake, truck, gear, compressor, motor, body, roof, trolley and other noises in operation of street cars.

Three-Car Articulated Trains. Detroit Operates New Three-car Articulated Train, A. C. Colby. Gen. Elec. Rev., vol. 27, no. 7, July 1924, pp. 441–448, 10 figs. Describes three-car articulated unit place in operation on Woodward Ave. line by Dept. Street Rys., designed to handle heavy passenger traffic on this route.

SUPERHEATERS

Locomotive. Criticism of Locomotive Superheaters (Zur Kritik des Lokomotivüberhitzers), R. P. Wagner. Zeit. des. Vereines deutscher Ingenieure, vol. 68, no. 37, Sept. 13, 1924, pp. 951–956, 29 figs. Requirements of steam superheaters, types used in Germany, possibilities of developments, bases for calculations.

Locomotive Superheaters. Superheater Co. (Locomotive Superheaters)—Bul. 11. Description, operation and maintenance of Elesco type "A" locomotive superheater.

T

TIME STUDY

Usefulness of. Making and Using Time Studies, H. K. Reed. Indus. Mgt. (N. Y.), vol. 68, no. 3, Sept. 1924, pp. 165–169, 2 figs. Problems of "maintenance" of time study, discussing those factors which, in final analysis, determine degree of concrete usefulness of time study in modern management.

TIRES, RUBBER

Efficiency. The Efficiency of the Pneumatic Tyre, H. S. Rowell. Rubber Age, vol. 5, no. 6, Aug. 1924, pp. 301–304 and (discussion) pp. 304–309. Notes on transmission of energy; prevention of skidding; avoidance of noise; mud splashing, etc.

TRANSPORTATION

Small Consignments, London. Small-Consignment Commodity-Distribution in London and Its Environs, J. Paterson. Soc. Automotive Engrs.—Jl., vol. 15, no. 4, Oct. 1924, pp. 352–358, 5 figs. Traces commodity movement from ships to lighters and to warehouses, from warehouses to stores, from stores to homes, to surrounding towns and to country districts, and gives details of distribution and collection system developed and operated by Carter, Paterson & Co., Ltd., Lond., a system employing horse-drawn and motor-vehicle equipment.

TUBES

Blast-Furnace-Slag. A New Process for Producing Tubes (Ein neues Verfahren zur Herstellung von Rohren), F. Riedel. Berichte der Fachausschüsse des Vereins deutscher Eisenhüttenleute (Ausschuss für Verwertung der Hochofenschlacke), no. 4, Jan. 18, 1924, 2 pp., 1 fig. Production of tubes from blast-furnace slag without addition of binders; tensile strength of tests of tubes.

Brass, Annealing of. Annealing of Brass Tubing in the Electric Furnace, R. M. Keeney. Am. Electrochem. Soc., Advance paper No. 9, for Mtg. Oct. 2–4, 1924, pp. 137–147, 3 figs. Methods and equipment at plant of French Mfg. Co., of Waterbury, Conn. Electric brass annealing proven to be more economical than annealing with wood fuel.

Brass, Manufacture of. The Manufacture of Brass and Copper Tubes, G. Evans. Metal Industry (Lond.), vol. 25, nos. 10, 13 and 14, Sept. 5, 26 and Oct. 3, 1924, pp. 217–219, 297–299 and 321–325, 20 figs. Refinery or foundry for copper-billet casting. Deals with development of piercing machines, describing present types of machine in use, their operation and adjustment. Describes suitable heating furnace and gives a plan of typical modern piercing-mill layout.

TURBO-GENERATORS

Westport Station, Baltimore. Turbine Packing, Bleeding Arrangements and Other Features of Westport Station Addition. Power, vol. 60, no. 16, Oct. 14, 1924, pp. 605–608, 3 figs. Describes special type of high-pressure packing gland, use of vertical hairpin tube heaters with special check valves and d.c. ball-bearing electrical auxiliaries, which are features of two newly installed 20,000-kw. turbo-generators ordered from Gen. Elec. Co. to replace four engine-driven 2000-kw. generators.

U

UNLOADERS

Modern types. Modern Construction of Grabs for Unloading (Neuzeitige Bauarten von Verladegreifern), R. Hänchen. Praktische Maschinen-Konstrukteur, vol. 57, no. 31, Aug. 19, 1924, pp. 429–434, 16 figs. Discusses new automatic grabs for bulk goods as to form, operation and efficiency, including Demag, Landi, Weigner, Méguin, Hulett and Losenhausen.

V

VALVE GEARS

Lentz. Steam Distribution by Means of Lentz Valve Gear (Stoomverdeeling door middel van Lentzkleppen), F. Muller. Ingenieur, vol. 39, no. 32, Aug. 9, 1924, pp. 595–602, 16 figs. Describes Lentz system of steam valve gear and governor, and their application to compound locomobiles and ship-propulsion machinery.

VAPORS

Pressures. Vapor Pressure Curves for System, Containing Alcohol, Ether, and Water, E. A. Louder, T. R. Briggs and A. W. Browne. Indus. & Eng. Chem., vol. 16, no. 9, Sept. 1924, pp. 932–935, 4 figs. Describes apparatus for determining vapor pressure; determination of vapor pressures of certain mixtures; from data obtained pressure-temperature curves have been constructed.

VISCOSIMETERS

Fischer-Bauer. Measuring Viscosity in Ceramics (Viskositätsmessungen in der Keramik), E. P. Bauer. Berichte der Deutschen Keramischen Gesellschaft, vol. 5, no. 2, Aug. 1924, pp. 27–75, 2 figs. Discusses various methods, and describes Fischer-Bauer apparatus, constructed on drop-ball principle with a counterweight added to decelerate time of drop. Examples of application.

Klever. Relation between Time of Flow of Klever Rapid Viscosimeter and the Engler Viscosimeter (Ueber die Beziehung zwischen den Ausflusszeiten des Kleverschen Schnellviscosimeters und des Englerschen Viscosimeters), H. W. Klever, R. Bilfinger and K. Mauch. Zeit. für angewandte Chemie, vol. 37, no. 36, Sept. 4, 1924, pp. 693–695. Experiments show that there is only a rough regularity in Klever apparatus and this cannot be reduced to a law.

W

WASTE ELIMINATION

Methods. Organizing to Prevent Materials Waste, C. B. Auel. Mgt. & Administration, vol. 7, nos. 6, 7, and 8, June, July and Aug. 1924, pp. 669–674, 65–70 and 185–190, 13 figs. Prevention and salvage of waste at Westinghouse plant. Standardization of parts; preparation of standards; purchasing specifications; manufacturing allowances and specifications; stores stocks control; quarterly "clean-up;" storing, boxing, and shipping; use of obsolete copper wire; etc.

WASTE STEAM

Utilization. Present State of Waste-Steam Technology and Economics in Germany (Gegenwärtiger Stand der Abdamftechnik und Abdampfwirtschaft in Deutschland), H. Treitel. Zeit. des Vereines deutscher Ingenieure, vol. 68, no. 35, Aug. 30, 1924, pp. 896–901, 11 figs. Discusses types of machinery and processes for turning to account all heads of heat and avoiding losses by condensation, including back-pressure machines, mixed steam, exhaust steam, etc.

WATER SOFTENING

Permutit. Note on a Permutit Water Purification Plant (Note sur une installation d'épuration d'eau à la "Permutite" au siège de Victor 3–4, à Rauxel), M. Stoeffler. Chaleur & Industrie, vol. 5, no. 52, Aug. 1924, pp. 383–385, 1 fig. Details of permutit tests and comparative cost of apparatus and operations.

WELDING

Automatic Welding Machines. Automatic Welding of Tank. Welding Engr., vol. 9, no. 9, Sept. 1924, pp. 17–19, 5 figs. Describes new machine which automatically welds circular end seams; revolves around work; flame oscillates; increases production.

Electric. See ELECTRIC WELDING; ELECTRIC WELDING, ARC; ELECTRIC WELDING, RESISTANCE.

Monel Metal. See MONEL METAL.

Oxy-Acetylene. See OXY-ACETYLENE WELDING

Rails. Welding of Non-Imbedded Tracks (Schweissung freiliegender Gleise), Wattmann. Maschinenbau, vol. 3, no. 24, Sept. 22, 1924, pp. 902–904. Experiences in track welding and comparative cost of welded joints and fishjoints. See translation in Eng. Progress, vol. 5, no. 9, Sept. 1924, p. LIX, 1 fig.

WOODWORKING PLANTS

Flooring Plants. A New Electrically Driven Flooring Plant, E. B. Clement. Gen. Elec. Rev., vol. 27, no. 9, Sept. 1924, pp. 602–608, 12 figs. Describes plant of Mitchell Bros. Co., at Cadillac, Mich. including notes on substation.

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Alphabetical List on page 194

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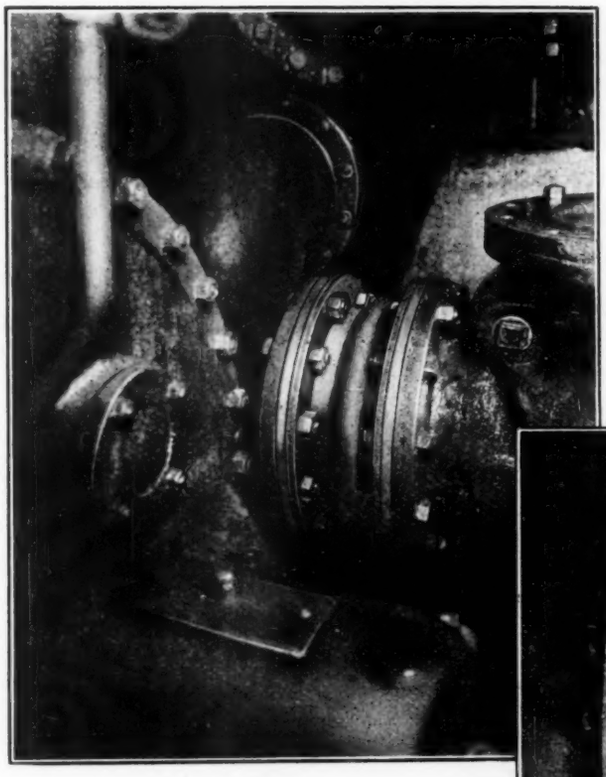

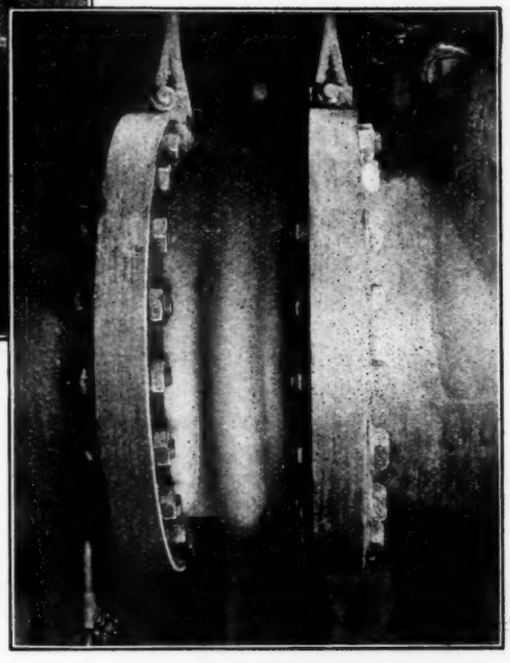

Above—A 14″ "U.S." Expansion Joint on a circulating water line from a Westinghouse condenser. This joint is subjected to extreme vibration by pulsations of water pump.

At right—A 22″ "U.S." Joint on a cold water inlet to condenser, where flanges are ⅜″ out of parallel.

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The steel case Terry turbine is especially designed for the latest type super-stations using high pressures and superheats. Many unusual features make it the most *dependable* unit of its type. Terry turbines are noted for their durability, reliability, ease of operation and long life.

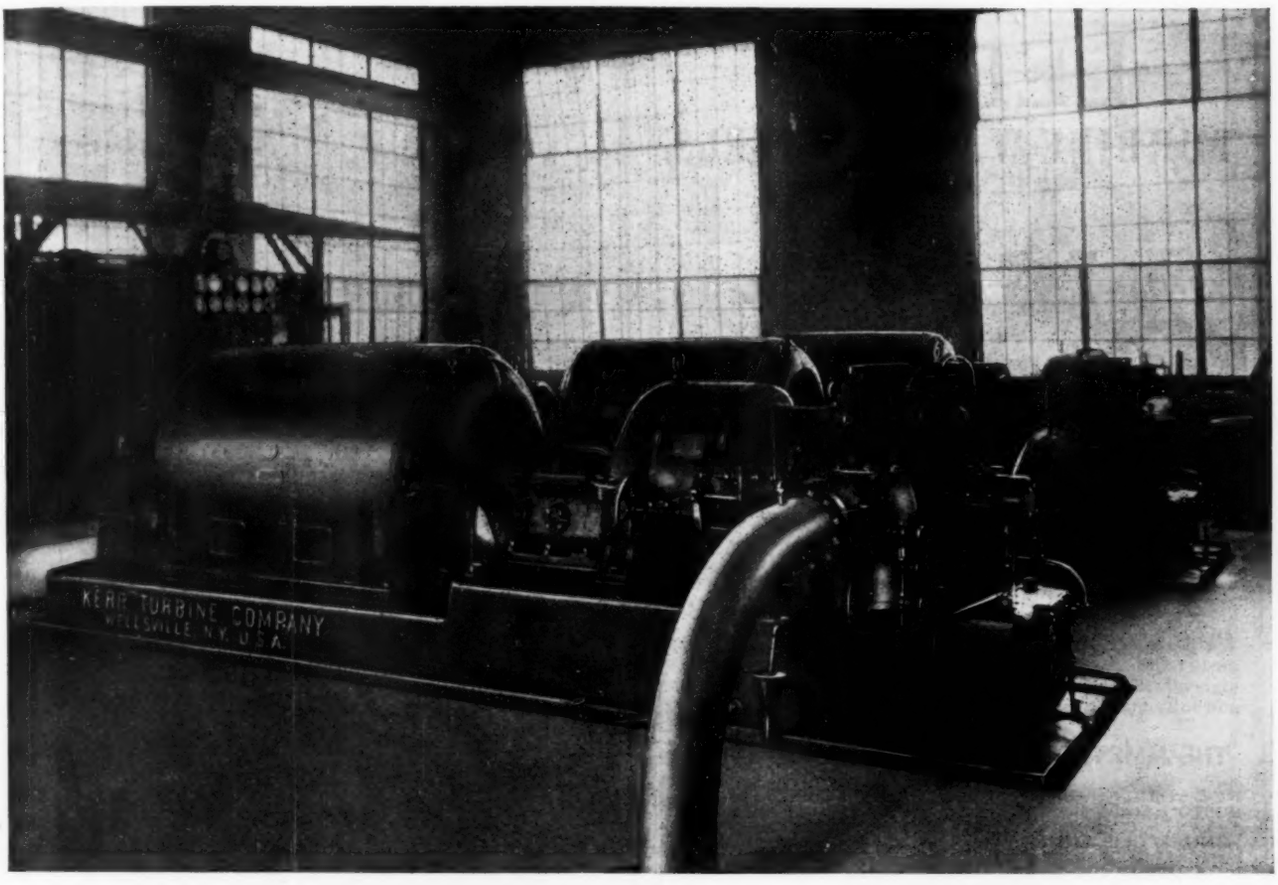
Illustrated below are two of four Terry steel case turbines driving boiler feed pumps in the new addition to the Cleveland Electric Illuminating Company plant. There are a total of 23 Terrys in the entire plant.

There is a Terry for every need within the scope of auxiliary drives. Let a Terry engineer give you the facts. Bulletin on request.

THE TERRY STEAM TURBINE COMPANY
Terry Square, Hartford, Conn.

Offices in Principal Cities in the U. S. A.
Also in Important Industrial Foreign Countries

T-928



Three 1250 Kw. Kerr Non-Condensing Turbine Generators at the Gulf Refining Company, Port Arthur, Texas

Power a virtual by-product in this refinery

Low pressure steam for operating the oil stills is obtained from the exhaust of these three KERR TURBINES.

Superheated steam in expanding through the turbines develops power and is exhausted clean and dry, ready to give up most of its heat to the stills. There is practically no extra fuel expense for power, which is virtually a by-product of the process work.

Complete satisfaction has been given by the turbines which have been in operation since 1917.

Kerr Turbines are giving many other important refineries the benefits of this practice. Wherever exhaust or bleeder steam is required for process work, a very great return on the investment may rightfully be expected.

Write for Bulletins describing Kerr High, Low and Mixed Pressure Turbines and Kerr Bleeder Turbines in ratings to 2,000 Kw.

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KERR TURBINE COMPANY
WELLSVILLE, NEW YORK U·S·A·

DISTRICT OFFICES IN ALL PRINCIPAL CITIES

LEFFEL
TURBINE WATER WHEELS

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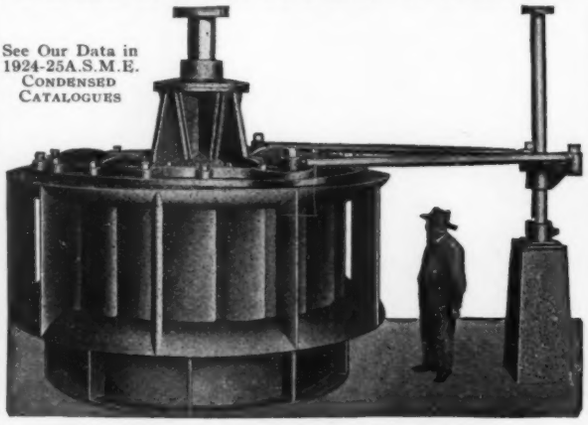

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We design and build vertical and horizontal turbines to meet requirements, developing high speeds, high powers, high efficiencies. Our turbines are of the latest designs, and fully guaranteed.

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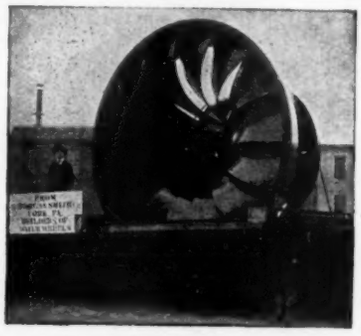
MINNEAPOLIS, MINN. ..... Plymouth Building
LANCASTER, PA. ..... Woolworth Bldg.
PETERBOROUGH, ONT., CANADA. . William Hamilton Co., Ltd.



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Built in all sizes and types, and segregated to suit the limits of transportation clearances.

Accompanying view shows turbine runner weighing 80,000 lbs. on special car.

Write Dept. "R" for Bulletin

S. MORGAN SMITH CO., York, Pa.

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ENGINES FANS, BLOWERS

Type V Vertical Steam Engine sets new standard of quality for small steam engines; steam and oil consumption remarkably low; unusually long-lived.

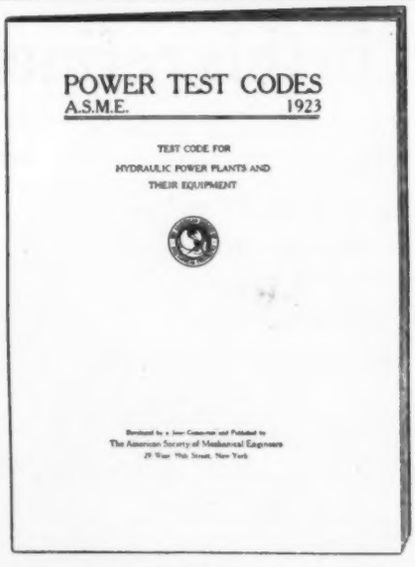
Clarage Kalamazoo Fans for every heating, ventilating, humidifying and air conditioning service; exhaust fans and pressure blowers for pneumatic conveying and mechanical draft.

Ask for the Bulletins

Clarage Fan Co., Kalamazoo, Mich.

Branches in principal cities.

See Our Data in 1924-25 A.S.M.E. Condensed Catalogues of Mechanical Equipment



Concerning the A.S.M.E. Power Tests Codes

The entire collection of Power Test Codes, when complete, will affect a wide range of industrial enterprises and provide a course of procedure by which everything ranging from a super power station to a boiler feed pump can be tested to see if they comply with the terms of purchase or if they are operating at the desired efficiency. Further information regarding these codes will be furnished upon request.

The Test Code for Hydraulic Power Plants and Their Equipment

The first of a series of sixteen codes to be issued during 1924 as a result of more than six years of work on the revision of the Power Test Codes of 1915.

The Code which was developed by a Joint Committee of the A.S.C.E., A.I.E.E., N.E.L.A. and the A.S.M.E., not only contains standard methods for testing the entire plant or any elementary part or parts of the plants, but tables useful in recording and computing the results, and directions for the use of instruments and apparatus required for the various measurements.

Price: 80c a copy
(To members of A.S.M.E. 70c.)

Publication-Sales Department, Date.....
The American Society of Mechanical Engineers,
29 West 39th St., New York City, N. Y

Gentlemen:—Please enter my order for.....copies of THE TEST CODE FOR HYDRAULIC POWER PLANTS AND THEIR EQUIPMENT. It is understood that my order will be promptly filled.

Price 80c a copy (To A.S.M.E. members 70c.)

Name.....
If member check here ☐ Address.....
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ME-12-24

City Conveniences where Central Station Power is not Available

THE Hydrolite is a practical hydro-electric plant that gives city conveniences to country homes.

It runs with less water and under lower heads than other types of turbines. An artesian well, running stream, or large spring will operate it.

Many of these plants are in operation. Some supply light and power to fine residences and others to small industrial plants.

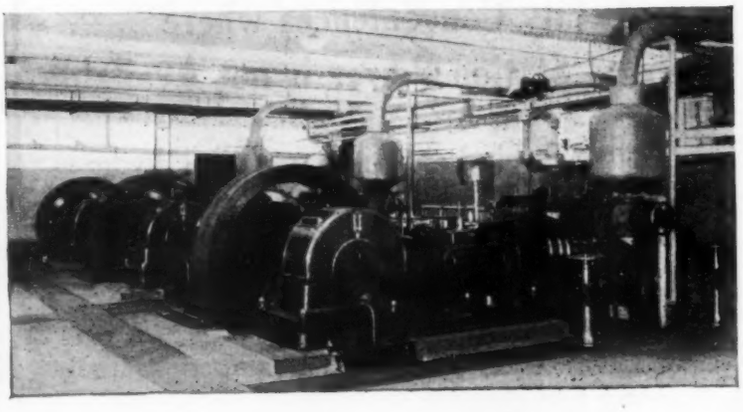
Made in standard sizes to generate from 150 to 500 watts. Larger sizes built to order.

Write for catalog containing full information.

Newport News Shipbuilding & Dry Dock Company
Dept. M.E. **Newport News, Va.**

The NEWPORT NEWS HYDROLITE

The "Universal Unaflow"



A review of the history of steam engineering will show that there never has been a time when one engine was so predominant over all other engines of similar and other types as the "Universal Unaflow" is over other steam engines being built today. This is because the "Universal Unaflow" principle is an original and novel idea which was patented. This patent with fifty others—many of major importance and all owned exclusively by the Skinner Engine Company—render copying impossible and make it

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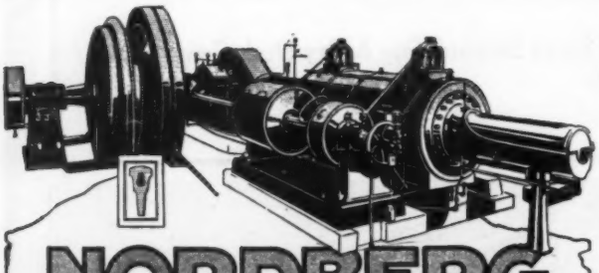
The Most Economical Steam Engine Ever Built

Built only by

Skinner Engine Company, Erie, Pa.

Branch Offices in All Principal Cities



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UNIFLOW ENGINES LEAD
THE WAY TO
GREATER ECONOMY AND LOWER POWER COSTS

UNIFLOW ENGINES
CORLISS ENGINES
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Compressors
Mine Hoists
BLOWING ENGINES
DIESEL ENGINES
Special Machinery

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MILWAUKEE WISCONSIN

COPPER EXPANSION JOINTS

For Low Pressure and Vacuum
Made in all sizes up to 96" Dia. Furnished Standard or with Special Drilling and Face to Face Dimensions.
Write for Prices
Can Make Prompt Shipments
Hamilton Copper & Brass Works Co., Hamilton, O.

TROY ENGINES

Use a Troy Engine where greater power in smaller space is required.

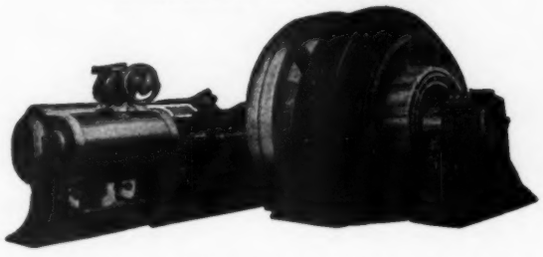
Investigate the Troy—It will pay you

Troy Engine & Machine Co.
Troy, Pa.

See Our Data in 1924-25 A.S.M.E. Condensed Catalogues of Mechanical Equipment

HARRISBURG

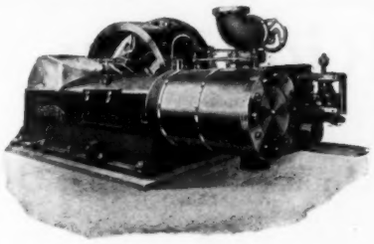
DUAL CLEARANCE
UNAFLOW STEAM ENGINE
(Built under Stumpf Patents)
HIGHEST ECONOMY



A SIMPLE TRUE UNAFLOW ENGINE
designed for reliable and economical service.

Obsolete engines, all makes, medium and high speed, modernized. Minimum cost.

Harrisburg Foundry & Machine Works
Harrisburg, Penna.
Offices in all Principal Cities.



An Engine of Universal Appeal

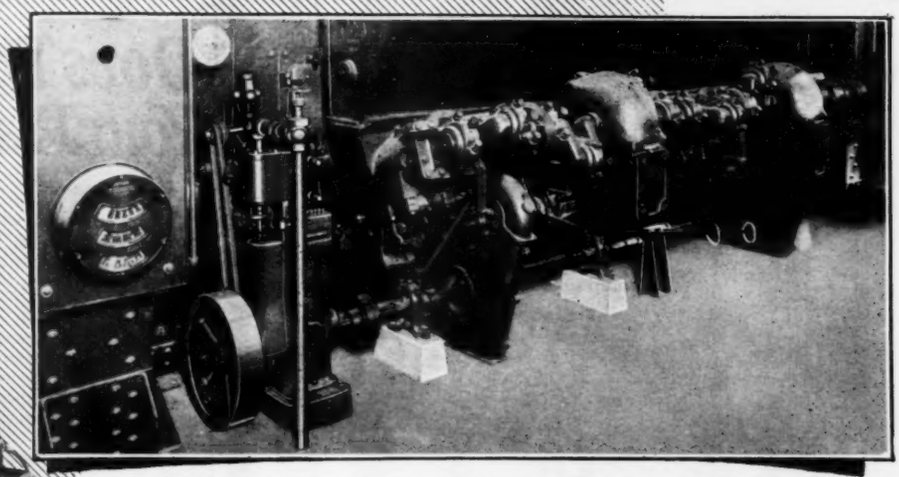
Reaching the peak of possibility in every performance. Delivering under all conditions the maximum of efficiency.

Horizontal **Vertical and High Speed**
Uniflow and Counterflow Patterns

Fitchburg Steam Engine Co.
Fitchburg, Mass.
Established 1871

Engberg
THE STANDARD FOR EFFICIENCY-DURABILITY-SERVICE

Engberg Generating Set.



Engberg Engines Driving Westinghouse Stokers. Milwaukee Sewerage Disposal Plant.

Performance so reliable—so economical and productive of saving—that you will insist on Engberg Equipment for all installations.

ENGBERG'S ELECTRIC & MECHANICAL WORKS
24 Vine St., St. Joseph, Mich., U. S. A.

ENGBERG
Vertical, Steam
ENGINES AND GENERATING SETS
GENERATORS **MOTORS** **SWITCHBOARDS**

Ridgway

Motor-Generator Sets

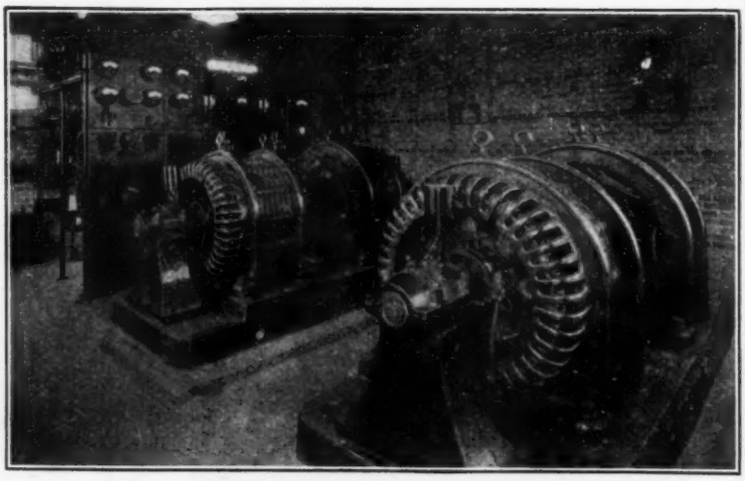
Automatically controlled

at

"Lumber Yard Substation"

Kingston Coal Co.

Kingston, Pa.



Generators may operate either in series or parallel, thus delivering 275 or 550 volts as desired.

In this case automatic control seemed desirable but in many cases manual control of both A.C. and D.C. is entirely satisfactory. In most cases an automatic reclosing circuit breaker to restore power to the main line after "shorts" will answer every requirement.

Ridgway M-G sets with liberal synchronous motors are the proper prescription for low power factor lines. Ask for bulletin No. 30.

RIDGWAY DYNAMO & ENGINE CO.
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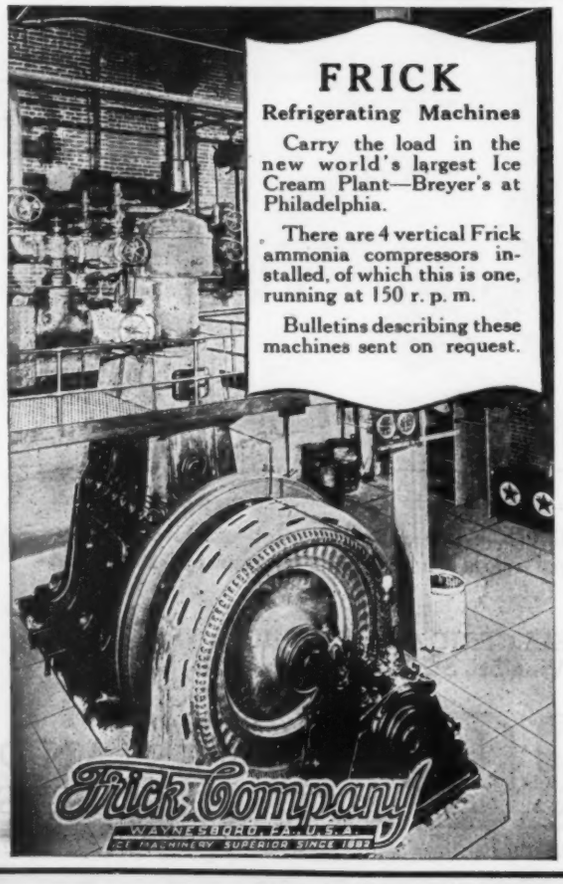
SALES OFFICES: BOSTON CHATTANOOGA CHICAGO CINCINNATI CLEVELAND DENVER DETROIT GRAND RAPIDS KANSAS CITY LITTLE ROCK MEXICO CITY MINNEAPOLIS NEW ORLEANS NEW YORK PHILADELPHIA PITTSBURGH ST. LOUIS SAN FRANCISCO WASHINGTON WILKES-BARRE



FRICK

Refrigerating Machines

Carry the load in the new world's largest Ice Cream Plant—Breyer's at Philadelphia.

There are 4 vertical Frick ammonia compressors installed, of which this is one, running at 150 r. p. m.

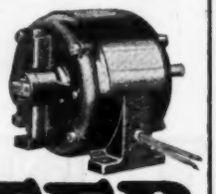
Bulletins describing these machines sent on request.

Does This Fit into Your Plans for 1925?

WHEN you go to your trade in 1925, what could possibly be sweeter music to their ears than a story of greater net profits! What could possibly have a stronger appeal than a story of reduced service costs!

If such a story for 1925 fits into your plans, by all means investigate the proposition that is being offered today in Master Motors. It is a proposition that deals in cold facts about the elimination of stalled motors; the elimination of burned out windings; the elimination of blown out fuses and many other troubles that "eat away" the profits of your dealers.

If you sell or design electrically driven appliances, the Master proposition will at least prove interesting reading. Write us for it today.

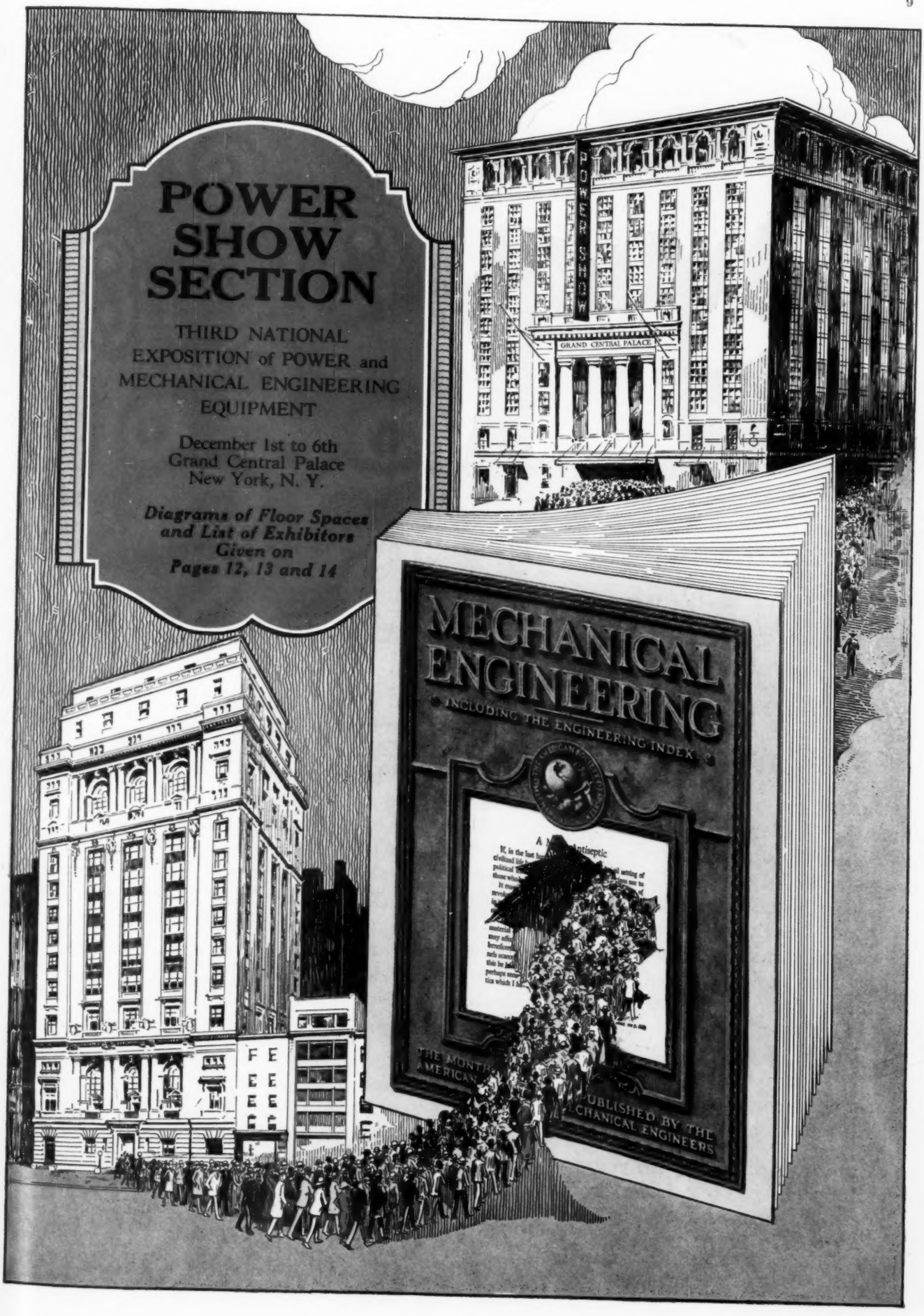


The Master Electric Co.

436 First St., Dayton, Ohio.

MASTER

¼ to 1½ HP MOTORS 40°C.



POWER SHOW SECTION

THIRD NATIONAL EXPOSITION of POWER and MECHANICAL ENGINEERING EQUIPMENT

December 1st to 6th
Grand Central Palace
New York, N. Y.

Diagrams of Floor Spaces and List of Exhibitors Given on Pages 12, 13 and 14

Portion of Main Floor just before opening of Power Show last year

Third Annual Exhibition of Power and Mechanical Engineering Equipment will have broader appeal to A.S.M.E. Members than heretofore.

A.S.M.E. MEMBERS have a two-fold interest in the Third Annual Exposition of Power and Mechanical Engineering Equipment which will be held at the Grand Central Palace during the week of the Society's Annual Meeting, and which will be nearly three times as extensive as when first held in December 1922. Their primary interest lies, of course, in the opportunity it affords for seeing and examining the latest machines and devices developed by leading manufacturers of mechanical engineering equipment, and of meeting in person the engineers and sales executives with whom in many cases they have been corresponding, or have known through previous business relations.

An almost equally important reason for being interested, however, lies in the fact that prominent members of the Society have been consulted in all important matters relating to the management of the Exposition; and that the recommendations of its special advisory committee, headed by I. E. Moultrop, have been followed in every instance where a question of policy or ethics was involved. One important result of this cooperation has been the broadening of activities this year, so that the diversity of exhibits shown; and the range of subjects covered by semi-technical lectures, industrial films, etc., will approximate the wide range of engineering matters in which A.S.M.E. members, as a whole, are interested.

Over three-hundred manufacturers will be represented by exhibits, which will occupy 150,000 square feet on three floors of the "Palace"; and will be arranged in accordance with the floor-space diagrams, etc., shown on the three following pages. These exhibits will include power plant apparatus and accessories, power transmission machinery,

materials handling equipment, heating, ventilating and air conditioning apparatus, refrigerating machinery, machine tools, and machine shop equipment. Specific information regarding many of the exhibits will be found in the accompanying two-color advertising pages.

A new feature of the Exposition this year will be a series of semi-technical lectures on the following topics:

The Boiler Room
Steam Prime Movers
Oil and Gas Engines
Hydroelectric Power Plant Equipment
Materials Handling
Modern Machine Tool Developments
Mechanical Power Transmission
Mechanical Refrigeration
Heating and Ventilating

These lectures will be held in the Assembly Hall at times which will not conflict with the A.S.M.E. proceedings; and will be supplemented by visits to the various exhibits of machinery and apparatus touched on in the lecture and discussion. The selection of speakers has not been completed, but every effort will be made to secure engineers of prominence in the respective fields covered. Moving pictures of an industrial or technical character will also be shown, and it is expected that recent "releases" along this line will add greatly to the novelty and interest of the Show.

Aside from its commercial aspect the Exposition offers other distinctive opportunities which, although less obvious, are almost as important in their contribution toward the upbuilding of the engineering industries. Those of our members whose connection with mechanical engineering matters has become highly specialized will find it an enjoyable means of "brushing up" their general knowledge; and of securing a personal contact with more recent developments, regarding which they might otherwise be too much dependent on their engineering associates or assistants. The younger members, on the other hand, and particularly those who are just entering the engineering field, may readily secure a fund of practical and commercial information which will constitute an important supplement to their recent technical education.

To every one attending it, the Third Annual Exposition of Power and Mechanical Engineering, will be a huge living catalogue of modern engineering products and processes, wherein every one may inspect each item intimately, and may secure expert information from men whose knowledge is the result, in many instances, of life long association with the special phase of engineering concerned.

A.S.M.E. members attending the Power Show will find the Society's Booth on the first floor, near the main entrance, and are urged to take advantage of the facilities which will be provided there for themselves and their friends. Further information regarding this booth will be found on page 94 of the following two-color pages.

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W. L. ABBOTT
Chief Operating Engineer, Commonwealth Edison Co., Chicago

HOMER ADDAMS
Pres. American Society of Heating and Ventilating Engineers

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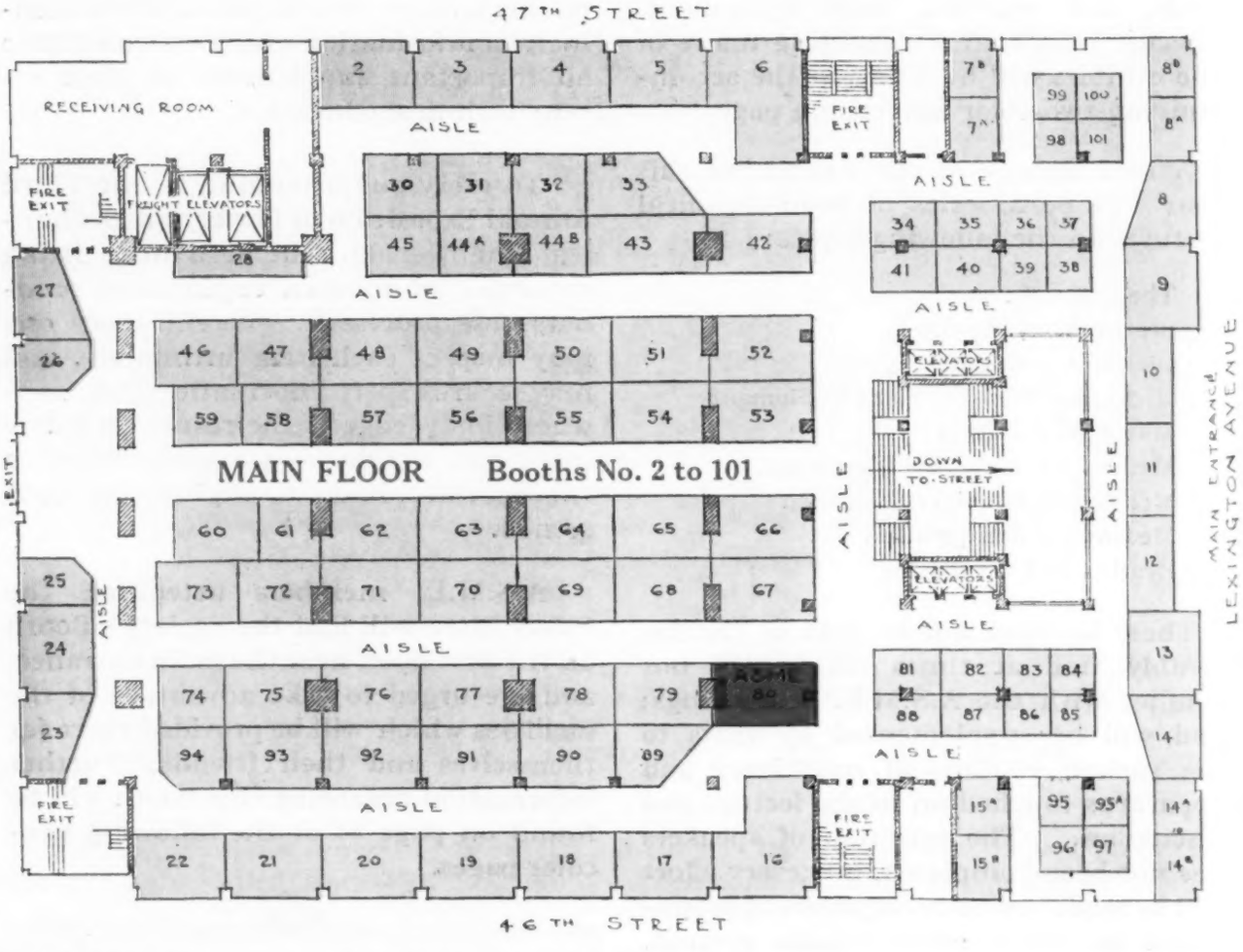
Diagrams of Floor Spaces and List of Exhibitors at Third Nat



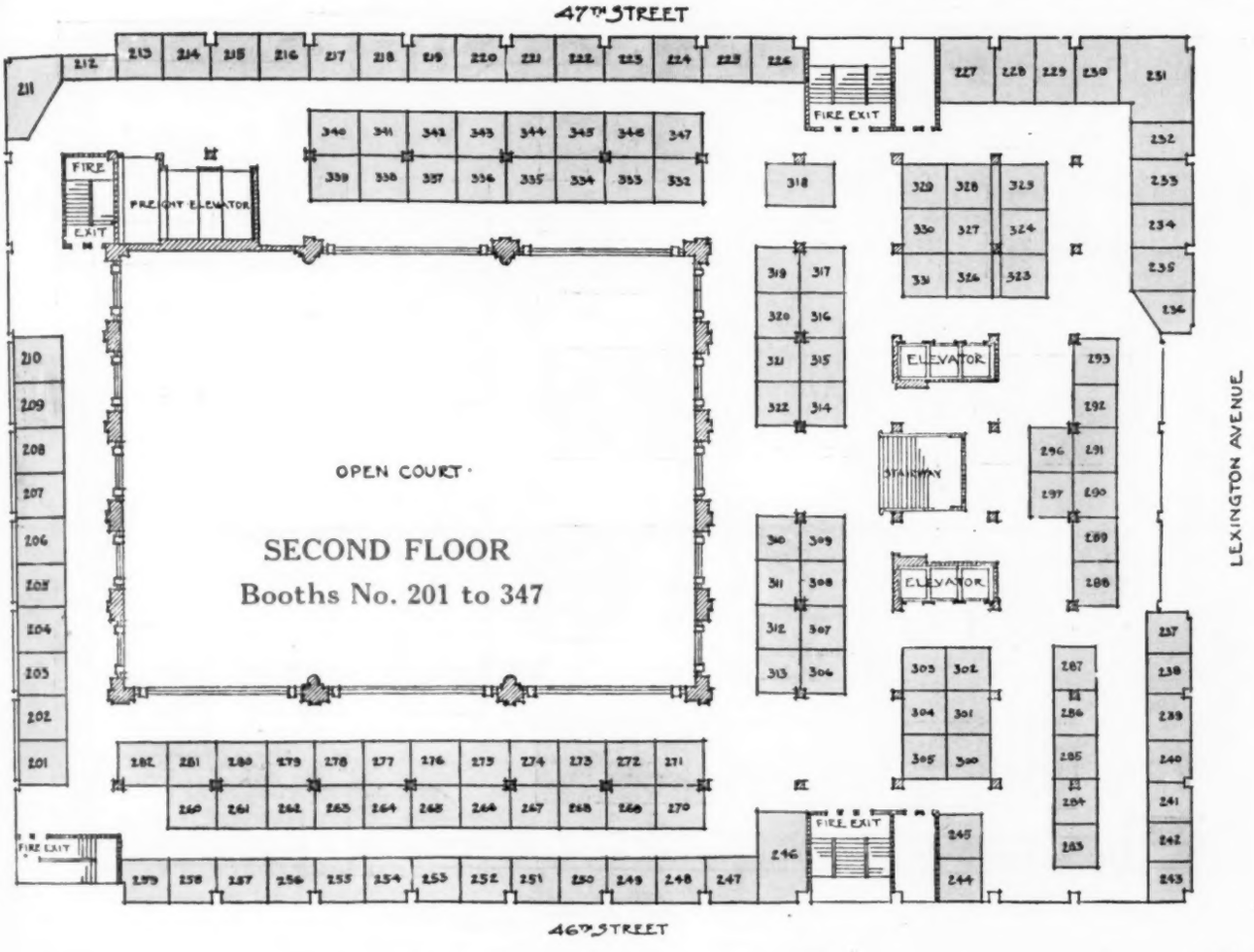
INFORMATION regarding the exhibits or products of firms listed in bold face type below is given in the following color pages. Each advertiser's booth may be located readily by referring to the diagrams of floor spaces shown on pages 12, 13 and 14.

List of Exhibitors

(Corrected to November 15)

	Booth
Ackerman Johnson Co.	539
Advance Engrg. Co.	260
Aero Pulverizer Co.	319–320
Alberger Heater Co.	204
Alexander Brothers	429
Allen-Sherman-Hoff Co. (Page 73)	**75**
Alsop Engineering Co.	212
American Arch Co., (Inc.)	58
American Blower Co.	495
American Brass Co.	65
American Chain Co.	48
American Pulverizer Co.	432
American Schaeffer & Budenberg Corp'n. (Page 56)	**74**
Amer. Soc. of Mech. Engrs. (Page 94)	**80**
American Steam Gauge & Valve Mfg. Co.	74
Ames, B. C. Co.	412
Anaconda Copper Mining Co.	65
Andale Engineering Co.	95A
Arca Regulator Co.	213–214
Armstrong Cork & Insulation Co.	208
Armstrong Machine Works	260
Ashcroft Mfg. Co.	60
Ashton Valve Co.	38
Atwood-Morrill Co.	552–553
Babbitt Steam Spec. Co.	90
Bailey Meter Co. (Pages 32, 33)	**54–55**
Baker–Dunbar Co.	16
Ballwood Co.	249
Barco Manufacturing Co. (Page 30)	**547**
Barnes & Jones	313
Bartlett-Hayward Co.	427–428
Bassick Mfg. Co.	312
Bayer Co.	550
Bayer Steam Soot Blower Co.	550
Beaumont, R. H. Co.	50–51
Bernitz Furnace Appliance Co. (Page 34)	**78**
Bethlehem Shipbuilding Corp'n (Page 26)	**70–71**
Bigelow Co. (Page 16)	**68**
Blackburn-Smith Co.	437
Blacker Engineering Co.	558
"Blast Furnace & Steel Plant"	413
Boiler & Equipment Supply Corp'n.	550
Boiler Kote Co.	280
Boston Gear Works Sales Co. (Page 57)	**340–341–342**
Bradley Washfountain Co.	247
Brady Conveyors Corp'n.	423
Bridgeport Brass Co.	44A
Bristol Co. (Page 91)	**12**
Brown Engineering Co.	28
Brown Instrument Co.	323
Budd Grate Co.	290
Buffalo Forge Co.	543
Buffalo Steam Pump Co.	544
Builders Iron Foundry (Page 23)	**276**
Bundy Steam Trap Co.	8
Burhorn, Edwin Co.	"A"
Cambridge & Paul Instr. Co.	263
Campbell, Andrew C.	410
Carborundum Co.	22
Carey, Philip Company	566
Carling Turbine Blower Co.	17
Carr Fastener Co.	285
Carrick Engineering Co.	423
Carrier Air Conditioning Co.	543–544
Cash, A. W. Co.	28
Celite Products Co.	14
Central Forging Company	441
Chapman Valve Mfg. Co. (Page 67)	**2**
Clark, Jas. Jr. Elect. Co.	343
Cleveland Worm & Gear Co. (Page 90)	**92**
Climax Engineering Co. 300-301-302-303-304-305	
Clipper Belt Lacer Co.	337
Cochrane Corp'n. (Page 24)	**67**
Coen Co., (Inc.)	15B
Columbus Machine Co.	509
Combustion Engrg. Corp'n. (Pages 62, 63)	**23, 24, 25**
Combustion Publishing Co.	53
Connelly, D. Boiler Co.	92
Conner, Wm. B. (Inc.)	329
Connery & Co., (Inc.)	43
Consolidated Safety Valve Co.	69
Continental Valve & Equipment Corp'n.	328
Coppus Engineering Corp'n. (Page 69)	**32**
Cory, Chas. & Sons, (Inc.). (Page 15)	**241–242**
Craig Damper Regulator Co.	79
Crane Co. (Page 49)	**52**
Crane Packing Co.	261
Crosby Steam Gage & Valve Co.	277–278
Culm-Burn Equipment Co.	286
Dampney Co. of America	248
Davidson, M. T. Co.	36–37
Dean, Payne, (Ltd.)	16
Dearborn Chemical Co.	13
d'Este, Julian Co. (Page 47)	**10**

National Exposition of Power and Mechanical Engineering



	Booth
Detrick, M. H. Co.	94
Detroit Belt Lacer Co.	222
Detroit Stoker Co. (Page 87)	**206–7**
Diamond Chain & Mfg. Co.	512
Diamond Power Specialty Corp'n. (Page 85)	**17**
Dick, R. & J. Co., (Inc.)	486
Dickson, Walter S. & Co.	423
Dixon, Jos. Crucible Co. (Page 28)	**508**
Dodd Mead & Co.	208A
Dodge, F. W. Co.	27
Drake Non-Clinkering Furnace Block Co. (Page 17)	**41**
Eastern Steam Spec. Co.	12A
Edge Moor Iron Co. (Page 77)	**288–289**
Edward Valve & Mfg. Co. (Page 72)	**30**
Elliott Company. (Page 48)	**271–272–273**
Ellison, Lewis M.	44B
Engineer Co.	18
Engineers Book Shop	28A
Erie City Iron Works. (Page 86)	**217–218**
Ernst & Co.	76
Everlasting Valve Co.	100–101
Fafnir Bearing Co. (Page 29)	**246**
Fairbanks Co.	531
Fairbanks, Morse & Co.	326–327–330–331
Falk Corp'n. (Page 60)	**338–339**
Falls Engine Stop Co.	17
Farnsworth Co.	425–426
Federal Gauge Co.	438
Filtration Engineers, (Inc.)	226
Filtrators Company, The	564
Fisher Governor Co.	15A
Flexible Steel Lacing Co.	315
Flynn & Emrich Co.	46
Foote Bros. Gear & Machine Co.	**540**
Foster Engineering Co.	84
Foxboro Co., (Inc.)	62
Frederick Iron & Steel Co.	92
Fuller-Lehigh Co.	14A–14B
Fulton Co. (Page 58)	**252–253**
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	Booth
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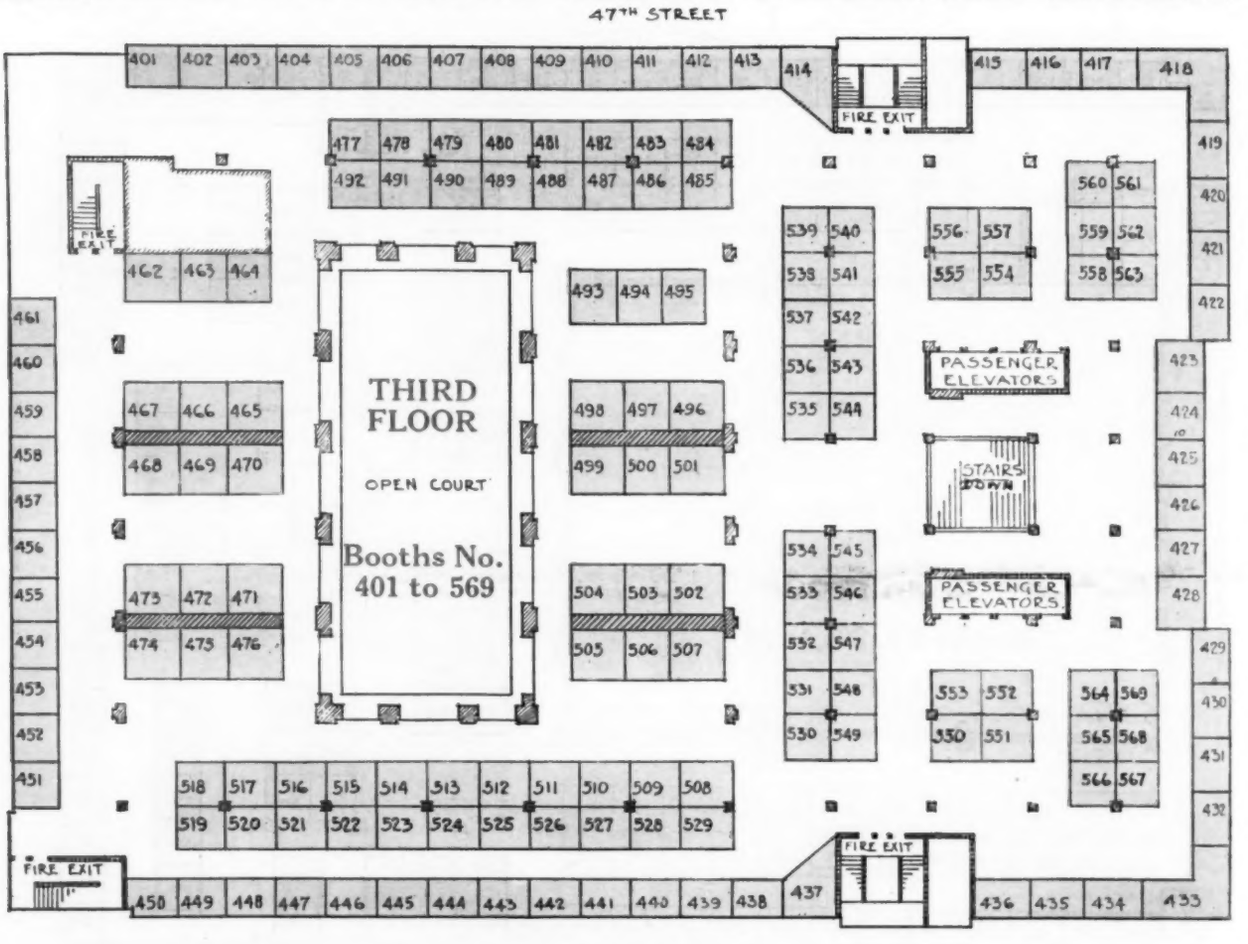

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See these in operation at the Power Show!

ILLUSTRATED are four subjects taken from the more important products of Cory. The Cory-Recony Standardized Unit System for the remote closing of inaccessible gate valves—the Robinson Interlock to protect men from opening disconnecting switches under load—the Cory Central Station Annunciator that warns the eye and the ear of trouble in any part of the plant and the Cory Visible Signal Systems for the instantaneous transmission of messages between important points in Industrial Plants.

Industrial Engineers are invited to visit the Cory Booth and watch these Systems in operation. A true perspective of Cory Service in the saving of life, equipment and time.

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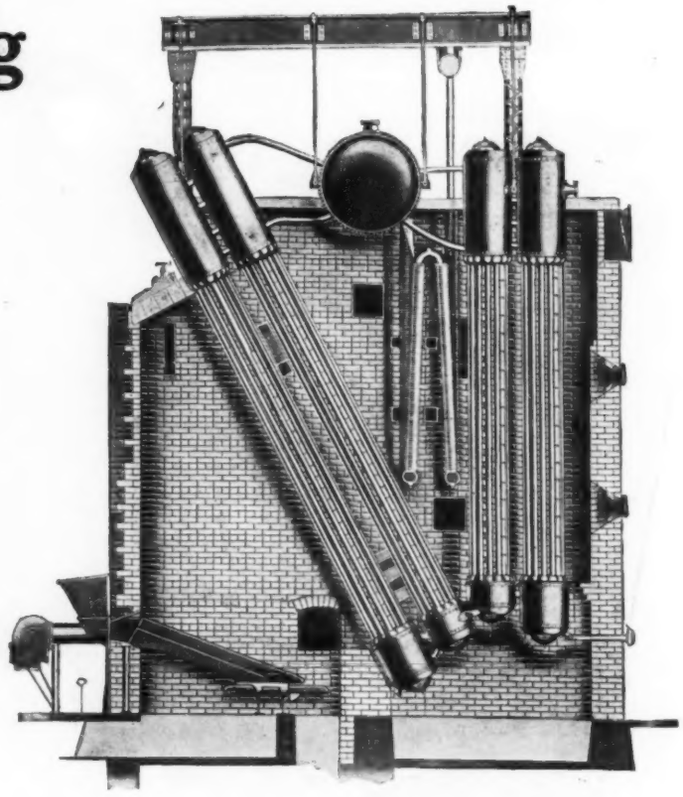
High Operating Efficiency—

Low Repair Cost—

Next to safety—these two features should be your first consideration in selecting the boilers that are most suitable for your plant.



BIGELOW-HORNSBY WATER-TUBE BOILERS

Booth No. 68

POWER SHOW

Grand Central Palace
New York

DECEMBER 1 to 6, 1924

A complete model of the Bigelow-Hornsby boiler will be on display, under actual working conditions, showing the circulation of water within the boiler and method of gas flow. There will also be on exhibition full size front course of a Bigelow Horizontal Return Tubular Boiler.

are notable for their excellence in economical steaming.

The scientific design provides for the maximum percentage of direct heating surface, extremely rapid circulation and free steam liberation.

Dry steam at all ratings and high flexibility in meeting all demands promptly are assured.

The gas flow is contrary to the circulation, so that the hottest gases meet the hottest water. The coolest gases are used to preheat the water entering the rear vertical tubes of the boilers. The construction affords ease of access for inspection, cleaning and tube renewals, when required. No tube hand-hole plates or stayed surfaces.

Furnished in units containing from 3750 to 55,000 sq. ft. of heating surface.

Write for illustrated Bigelow-Hornsby Catalog.

The Bigelow Company, 20 Lloyd St., New Haven, Conn.

Boston
141 Milk St.

Manufacturers of the Bigelow Horizontal Return Tubular Boiler

The oldest and Largest manufacturers of Steam Boilers in the New England States

New York
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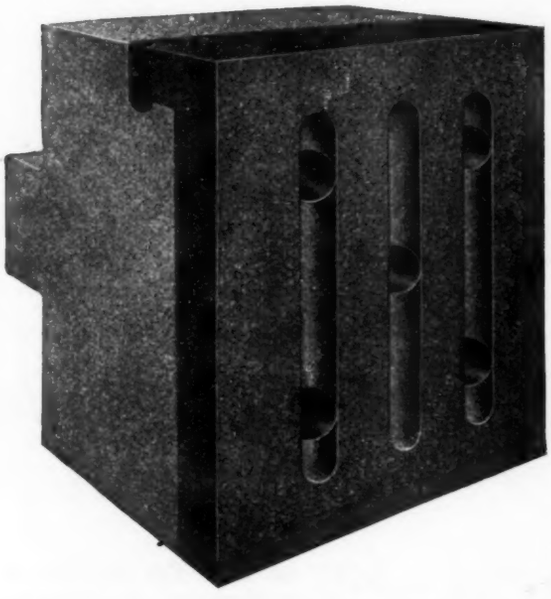
There is a DRAKE BLOCK for every furnace use

DRAKE BLOCKS

The First Non-Clinkering Furnace Block



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DRAKE "CARBO-GLAZE" BLOCK
Resists Higher Temperatures

The Blocks that make it possible to get the lowest cost installation of silicon-carbide refractories

Visit Booth No. 41 at the Power Show and see the entire Drake Block Line.

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Drake Non-Clinkering Furnace Block Company, Inc.
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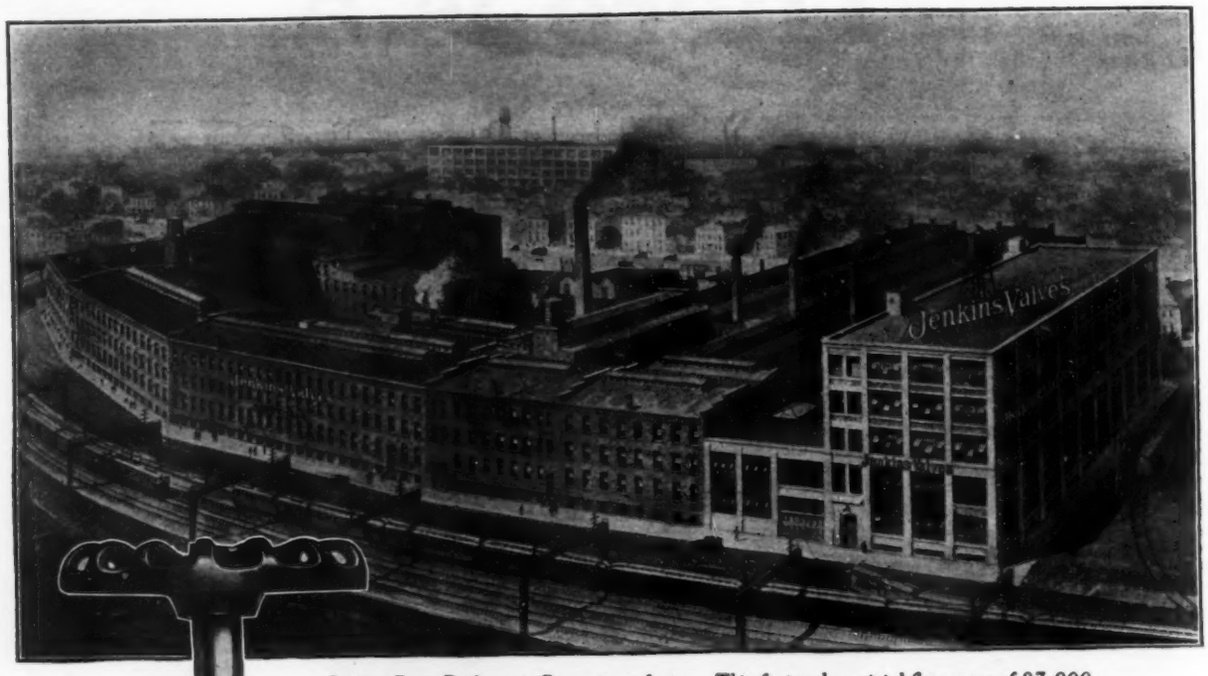
Atlanta Detroit Cleveland Pittsburgh Milwaukee Chicago Boston Philadelphia Montreal Cincinnati

AT BOOTH No. 90 - POWER SHOW DEC. 1 - 6

It is valve service that



Jenkins Bros. Bridgeport, Connecticut, factory. This factory has a total floor space of 87,000 square feet for the manufacture of bronze valves, and a five story reinforced concrete building with a floor space of 67,000 square feet for the manufacture of iron and steel valves.

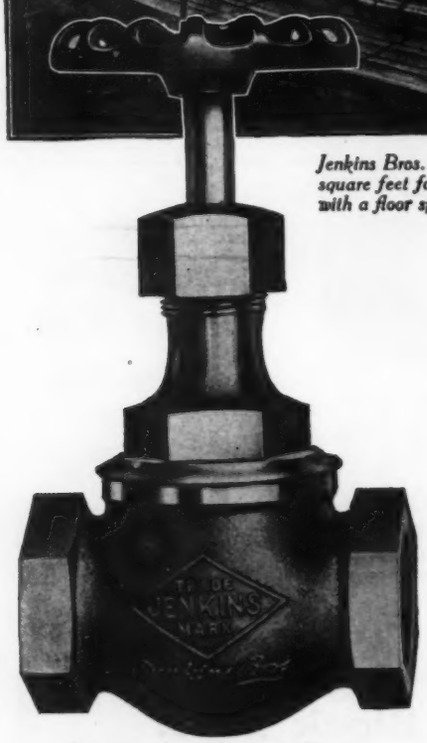


Fig. 106, Jenkins Standard Bronze Globe Valve.

You are invited to visit our exhibit

MAY we have the pleasure of your inspection of the comprehensive line of Jenkins Valves which we will exhibit at the power show, during the A.S.M.E. Convention?

We would appreciate the opportunity of showing you Jenkins construction; of describing Jenkins standardized method of manufacture which insures absolute interchangeability of parts; and of explaining the points of Jenkins Valves which provide a valve service that means true economy in maintenance.

JENKINS BROS.

80 White Street, New York, N. Y. — 133 North Seventh St., Phila., Pa.
504 Atlantic Ave., Boston, Mass. — 646 Wash. Boulevard, Chicago, Ill.

JENKINS BROS., LIMITED

Factories: Montreal, Canada; Bridgeport, Conn. — London, England; Elizabeth, N. J.; Montreal, Canada

Jenkins Valves

SINCE 1864

governs valve economy

Fig. 370, screwed, Standard Bronze Gate Valve.

Fig. 715, screwed, Bronze Angle Fire Line Valve.

Fig. 750, screwed, Jenkins Bronze Marine Globe Valve.

Fig. 352, screwed, Standard Bronze Swing Check Valve.

Fig. 330, screwed, Standard Iron Body Gate Valve.

Fig. 720, Jenkins Bronze Rapid Action Valve.

Fig. 293, flanged, Extra Heavy Iron Body Automatic Equalizing Stop and Check Valve.

Fig. 144, flanged, Standard Iron Body Angle Valve.

JENKINS PACKINGS

Make tight, durable joints. Do not crack, crumble, or squeeze out of the joint.

JENARCO

A red vulcanized packing. For hot and cold water, and for saturated steam at high or low pressure.

COMPRESSED ASBESTOS JOINTING

Specially made for high pressure, superheated steam service

JENKINS '96

The original unvulcanized sheet packing. For saturated steam under all pressures, and for hot and cold water, and other liquids.

JENKINS READY-CUT GASKETS

We can supply gaskets cut from Jenarco, Compressed Asbestos Jointing, or Jenkins '96. They come ready for use, in every kind of service.

JENKINS PUMP VALVES

Made specially for various services. When ordering, state service, fluid handled, head pumped against, diameter, thickness and size of hole.

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Made in various compounds for hot and cold water, steam, air, gas, oil, and other fluids and vapors. When ordering Jenkins Valves, or Jenkins Discs, always specify service.

Jenkins Valves

SINCE 1864

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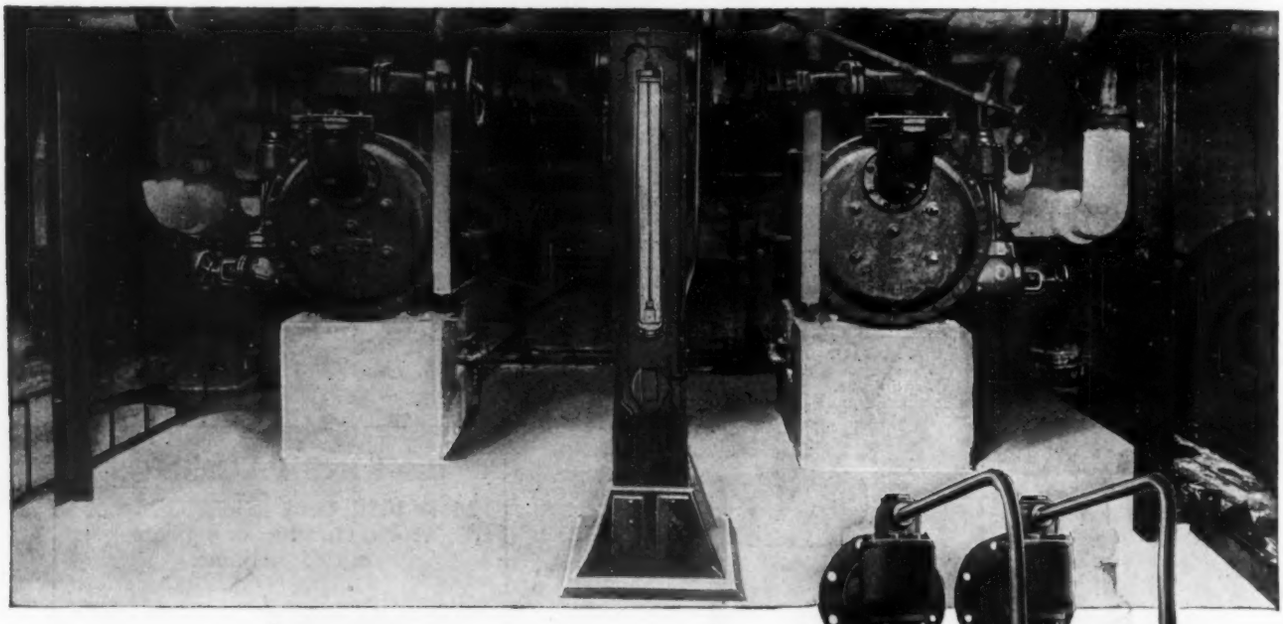
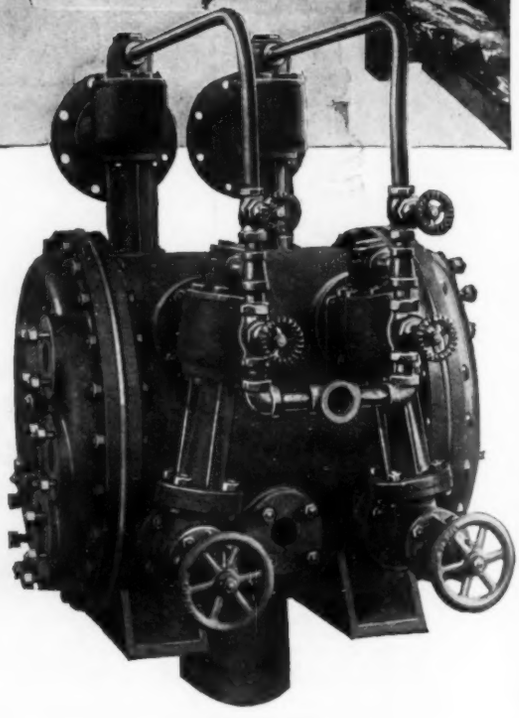
AT BOOTH No.64 - POWER SHOW - DEC. 1-6





Proof That High Vacuum Is Maintained Closer to the Theoretical with the

WHEELER Steam Jet Air Pump

THE excellent readings shown below are those taken on 30,000 K.W. Wheeler Condensing Equipment, equipped with two Wheeler Steam Jet Air Pumps and two Wheeler Circulating Pumps each being halfsize. Only one air pump and one circulating pump was in operation at the time the readings were taken. *Note comparatively heavy load.*

Load	20,000 K.W. (66⅔%)
Vacuum Corrected	29.57 In.
Theoretical Vacuum	29.64 In.
Steam Temp.-Exhaust Nozzle	54.50
Condensate Temperature	57
Inlet Water Temperature	38

Our New Steam Jet Air Pump Catalog will make you familiar with this latest type of Air Removal Apparatus.

WHEELER CONDENSER & ENGINEERING CO.

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Works - CARTERET, N.J., NEWBURGH, N.Y.

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to see our new development

Vogt

DROP FORGED STEEL VALVES AND FITTINGS

THIS is your invitation to become familiar with our most recent developments—a series of Vogt Drop Forged Steel Gate Valves. Their sizes range from 1 to 6 inches inclusive; pressures are to 900 pounds, and they are used successfully for temperatures as high as 1100° F. Valve bodies are machined from one-piece solid steel forgings.

Although Vogt Drop Forged Steel Gate Valves will be the feature of this exhibit, all types and sizes of Vogt Drop Forged Steel Valves and Fittings will be upon display—there will be 231 different valves and fittings.

Vogt representatives shall gladly discuss with you your valve and fitting problems, and explain the advantages of Vogt Drop Forged Steel Valves and Fittings.

The place is the Grand Central Palace, New York City.

POWER SHOW DEC. 1-6 1924

BOOTHS 269-70

HENRY VOGT MACHINE CO.
Incorporated
LOUISVILLE, KENTUCKY
NEW YORK, CHICAGO PHILADELPHIA DALLAS

MANUFACTURERS OF DROP FORGED STEEL VALVES AND FITTINGS, ICE MAKING AND REFRIGERATING MACHINERY, WATER TUBE AND HORIZONTAL RETURN TUBULAR BOILERS, OIL REFINERY EQUIPMENT.

11½ Years' Service and Still Going Strong!

G&G Telescopic Hoists are built for quick and efficient ash removal; save time, labor and money

After 11½ years' service in Public School No. 61, on East 12th Street, New York City, a Model A G&G Telescopic Hoist is still in first class operating condition.

This was the first G&G Telescopic Hoist installed for the Board of Education of the City of New York in February 1913. Since that time several new electric models have been brought out and today there are eighty four G&G Hoists operating in New York City Schools, 77% being Model E electrically operated Hoists. A recent typical installation is shown in the illustration.

The same sturdy, dependable materials and careful workmanship which went into the Model A Hoist 11½ years ago, characterize the present day G&G models. They are built for rapid removal of ashes, with saving of time and the elimination of unnecessary labor. In the case of the electric Hoists, the amount of current consumed is remarkably low.

If you will tell us the quantity of ashes to be removed daily, distance of lift and something about the working conditions of your plant (submit sketch if possible) we will recommend type of hoist to use and give you the cost. Illustrated booklet on request.

GILLIS & GEOGHEGAN

521 West Broadway, New York

See this equipment under actual working conditions, really operating, at the Power Show, Grand Central Palace, New York City, December 1st to 6th.

Don't miss this feature at the Show, Booths Nos. 87-88.

FROM HYDROGEN TO QUICKSILVER

There is a VENTURI METER for every important fluid line in the power or industrial plant.

COLD WATER GRAVITY MAINS
PUMP DISCHARGE
WATER TO CONDENSERS
PENSTOCKS

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INDIVIDUAL BOILER FEED
HOT WATER FOR HEATING

STEAM MAINS FROM BOILER BATTERIES
STEAM DISTRIBUTION

GAS LINES FROM COKE OVENS
AND BLAST FURNACES

BRINE
LIQUID AMMONIA
CHEMICAL SOLUTIONS

THE VENTURI FOR ECONOMY'S SAKE!

BUILDERS IRON FOUNDRY

Builders of the Venturi for 33 Years

PROVIDENCE, R. I.

AT BOOTH No. 67 - POWER SHOW - DEC. 1-6

Come to the Power Show

December 1 to 6, 1924

EVERY steam engineer owes it to himself to keep in touch with the latest improvements, by visiting the

COCHRANE

TRADE MARK REG. U. S. PAT. OFF.

EXHIBIT

Booth 67, facing main entrance

GRAND CENTRAL PALACE
NEW YORK CITY

COCHRANE engineers in attendance will answer questions and explain working of Heat Balance arrangements, Deaerating Heaters, Water Softeners, Extraction Heaters, Pressure Filters, Flow Meters, Safety Exhaust Valves, etc.

For further particulars write for Catalog K-1080

COCHRANE CORPORATION

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FOR BLAST FURNACES
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OFFICES IN ALL PRINCIPAL CITIES
OF THE WORLD

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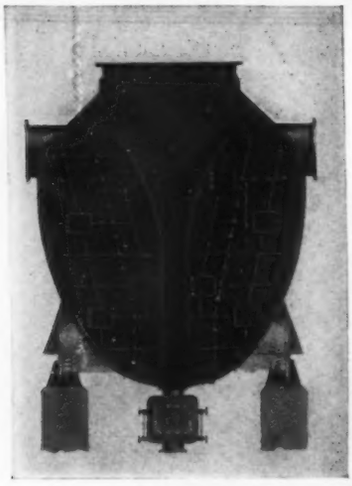
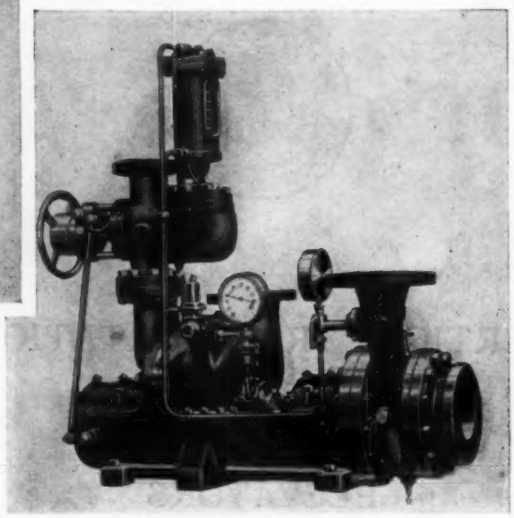
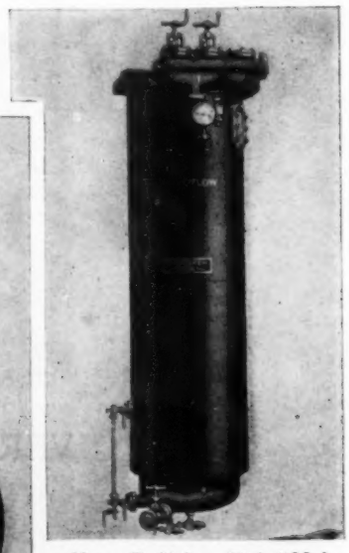


Above: Bethlehem-Weir Regenerative Condenser, the latest development in condenser practice.

Below: Bethlehem-Weir Turbo-Feed Pump. A single-stage centrifugal pump, direct connected to an impulse turbine. For discharge pressures up to 650 lbs.





Above: Bethlehem-Weir "Multiflow" Feed Water Heater. Surface type, using copper tubes as heating surface.

A dependable unit for every power plant requirement

THE engineer who is selecting equipment for a modern power plant will find that for each of the various auxiliary services there is a dependable Bethlehem-Weir unit that will fill the requirements economically and satisfactorily.

There are Bethlehem-Weir Pumps for every duty, Bethlehem-Weir Condensers, Feed Water Heaters, Evaporators, Air Compressors, and other units, to cover every power plant need.

Each of these Bethlehem-Weir units is conscientiously built of selected materials on a scientific design based on a complete analysis of all the factors involved, and is thoroughly fitted for its allotted work.

Entrusting the auxiliary services in a plant to Bethlehem-Weir Equipment means that all of the auxiliary units measure up to the same high standard, and, because of their capability and long life, contribute measurably to the economy of the plant.

See Bethlehem's Exhibit at the Power Show—Booths 70 and 71

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GENERAL SALES OFFICES: 25 BROADWAY, NEW YORK CITY
Sales Offices in Boston, Philadelphia, Wilmington, Baltimore, San Francisco
Power Plant Equipment Works, Moore Plant, Elizabeth N. J.

BETHLEHEM WEIR *Power Plant Equipment*

BETHLEHEM-WEIR
POWER PLANT EQUIPMENT

PUMPS

Turbo-Feed Pumps, Reciprocating Feed Pumps, Fuel Oil Transfer Pumps, Forced Lubrication Pumps, Turbine- and Motor-Driven Feed, Condensate and Centrifugal Circulating Pumps, Motor Driven Centrifugal Service Pumps.

FEED WATER HEATERS

Multiflow Type Surface Feed Water Heaters, Direct-Contact Feed Water Heaters.

FEED SYSTEMS
CORROSION DETECTORS
CONDENSERS

Regenerative Condensers
Complete Condensing Plants

EVAPORATORS
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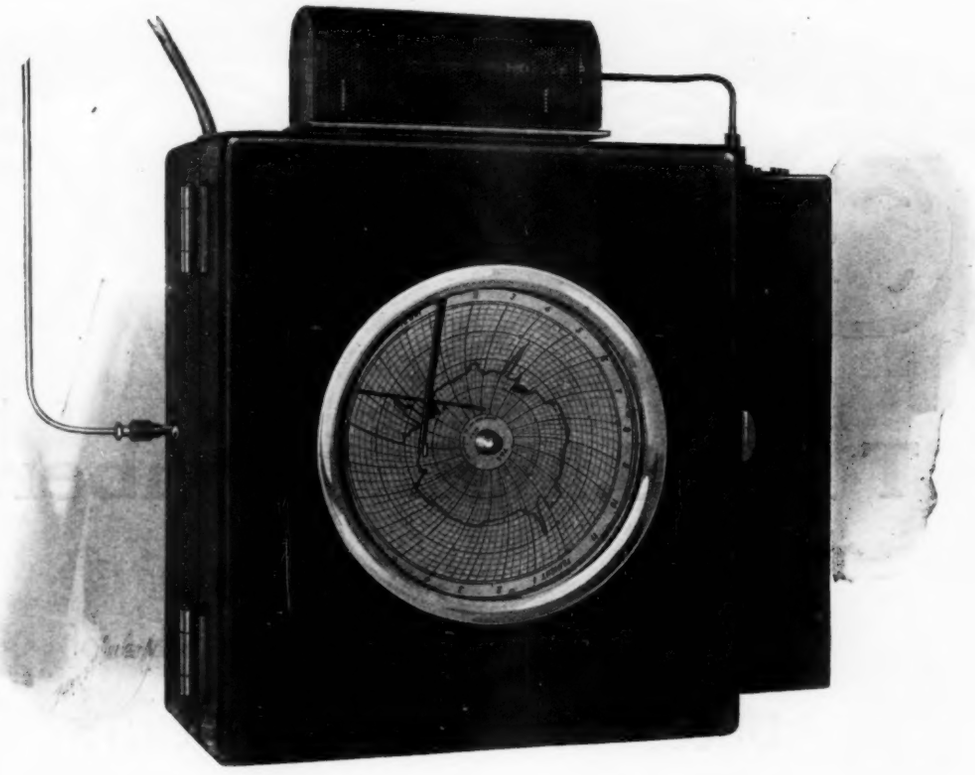


This New Instrument Will Revolutionize Boiler House Practice

What No Other Instrument Has Ever Done..... **It does!**
Weaknesses Believed "Inevitable" in such devices.. **Eliminated!**
Advantages Long Desired but Thought "Impossible".. **Attained!**

You Yourself Will Share our Confidence and Enthusiasm when you

See It In Operation
At the Power Show-Booth 59

See the whole TAG Line of Power Plant Necessities

C. J. TAGLIABUE MFG. CO.

18 TO 88 THIRTY-THIRD ST., BROOKLYN, N.Y.

Insist on Mercury Thermometers with the TAG-Hespe RED Reading Column

TAG TAGLIABUE MFG CO N.Y.

SINCE 1769

AT BOOTH No. 508 - POWER SHOW - DEC. 1-6

To A.S.M.E. Members:

You are invited to visit the exhibit of

DIXON GRAPHITE PRODUCTS

Booth 508

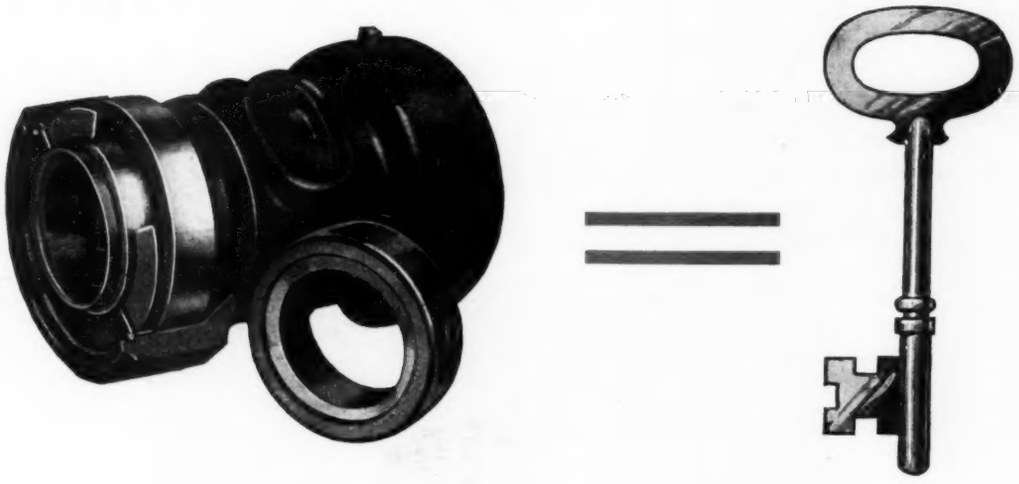
POWER SHOW—Dec. 1st to 6th, 1924

and learn of some of the more recent developments in graphite and graphite lubrication.

JOSEPH DIXON CRUCIBLE COMPANY

Jersey City **New Jersey**

Established 1827



FAFNIR OFFERS The Key to Power

As long as the shafts and pulleys go around at the necessary speed, some engineers think they are getting all the power that can be asked. Because they will not check up on the difference between their potential power and the actual power delivered, they remain blind to the tremendous reservoirs of power, unused but always available if only they will help themselves, in their own plants.

And it is in the line shafting that most of this untapped reserve is concealed. *Fafnir Ball Bearing Hanger Boxes* are the key with which the executive can unlock this closed door to his reserve if he will. We will hold out this key to you at the Power Show —will you accept it?

The Fafnir Bearing Company

DETROIT **New Britain, Conn.** CHICAGO

FAFNIR

BALL BEARINGS

AT BOOTH No. 547-POWER SHOW - DEC. 1-6

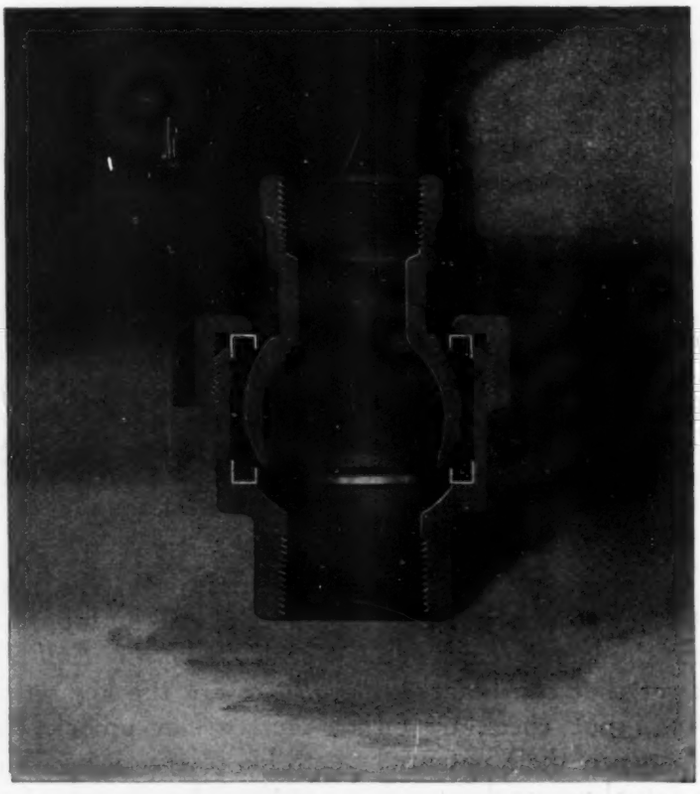
BARCO FLEXIBLE JOINTS

provide

combined angle and swivel movement with absolute tightness under suction or pressure in any service, including oil, air, steam, water and other liquids or gases.

OVER 1,000,000 IN SERVICE

Lightest and strongest construction



Easy adjustment under pressure

USED AND RECOMMENDED FOR

- Steam Shovels
- Road building machinery
- Loading and unloading tankers
- Steam and air lines to vessels under repair
- Sand Suckers
- Dredges
- Mine drills
- Quarry pipe lines
- Mine pumps
- Platen presses
- Tire curing machinery
- Milk and egg drying machinery
- Gas pipe lines
- Weighing tanks
- Water works piping
- Water works intake lines and recess pipe lines under streams
- Channeling machines

Barco Manufacturing Company

THE HOLDEN CO., LTD.
In Canada
MONTREAL - TORONTO

1801-1815 Winnemac Ave.,
CHICAGO, ILL.

THE HOLDEN CO., LTD.
In Canada
WINNIPEG - VANCOUVER

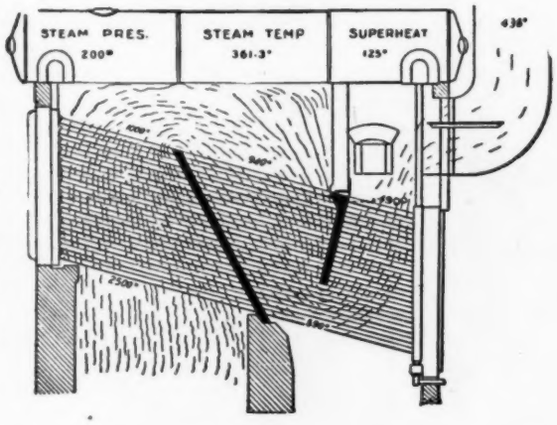
You Will Have an Opportunity to Examine

"MONO" BOILER BAFFLES

A tight baffle wall is one of the most important safeguards against heat loss and coal waste.

Boiler baffling that is correctly built will force the products of combustion to come in contact with from 90% to 98% of the effective heating surface of the boiler and reduce the temperature of the escaping flue gas to within approximately 50° of the saturated steam temperature and so, from the moment of its installation, increase the value of your coal pile. By extracting the limit of heat units before reaching the flues, proper baffling will make each ton of fuel do its utmost and the heat it produces will be saved.

This is how "Mono" Boiler Baffling will reduce your operating costs.



"MONO" BAFFLES

"Mono" (Monolithic) Boiler Baffling hugs the tubes, no matter at what angle they are set; and it is one piece, no joints, cracks or seams to open up. It can be installed in any position on any boiler and will give maximum efficiency for years.

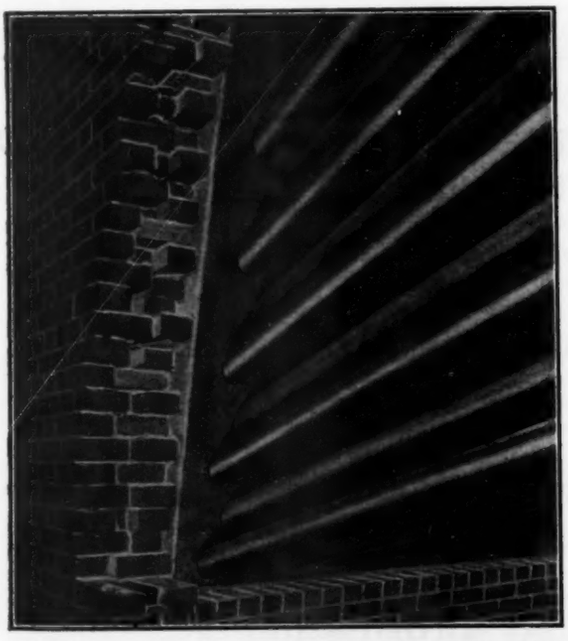
Tubes may be withdrawn and replaced, or cleaned with air-driven turbine cleaners.

"Mono" Baffling will not (unlike other baffflings) crack, spall or burn away.

Service:

In as much as all boilers are not baffled alike and the baffling on like boilers varies with the service conditions, we earnestly recommend that you consult our engineers before installing or renewing baffles.

Send for our bulletin and list of users. Then ask the man who uses "Mono."



The Illustration above Shows a First-Pass "Mono" Baffle as Seen through an Opening in the Side Wall, Looking toward the Rear of the Boiler. Note the Absolutely Monolithic Construction—the Close Fit around Tubes and against the Walls—and the Entire Freedom from any possibility of Leakage.

FLAME BRAND High Temperature Cements

Blue Flame (Dry) Fire Brick Cement:

Is a carefully compounded high temperature cement made of the highest grade refractory materials obtainable and is especially adapted for the bonding of mason work, building of boiler furnaces, in reverberatory and other types of high temperature furnaces. Blue Flame Cement fluxes on the face of the joints and when fluxed it forms a gas-tight joint.

Red Flame (Dry) Veneer Cement:

A mixture made from the very best heat-resisting materials and is used as a wash veneer on the face of the fire brick exposed to the products of combustion, prevents infiltration of cold air into the fire box, also the cracking, checking and spalling of fire brick.

White Flame (Dry) Insulating Cement:

Is used for covering all exposed heating surfaces in Power Houses where high pressure steam is generated and superheat used, such as covering boiler shells, drums, heads, feed water heaters, valves, pipes, fittings, also for insulating purposes between brick work and metal jackets on boilers and retorts, roofs of projected arches and heat treat furnaces.

Write for Bulletin "B" on our line of Flame Brand Refractories.

KING REFRACTORIES CO., Inc.

Main Office and Works:
Buffalo, N. Y.

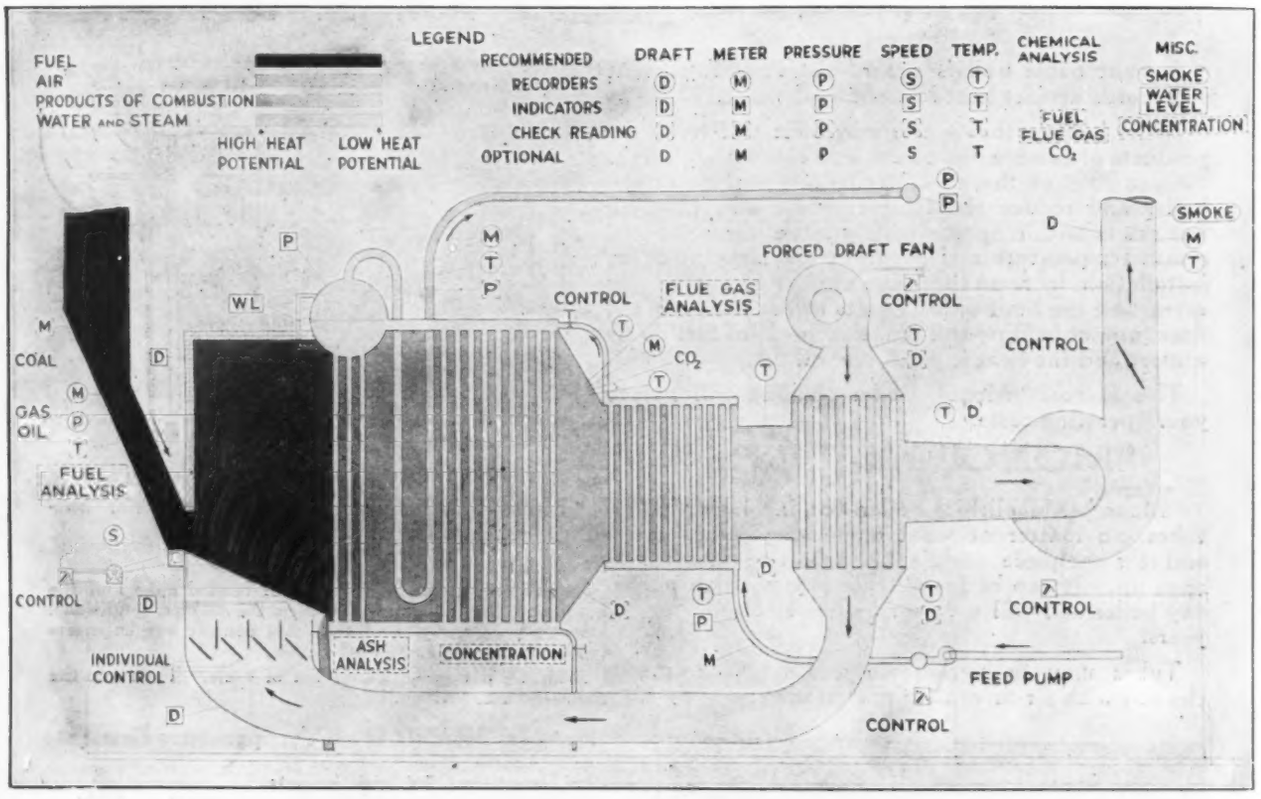
BRANCHES:

NEW YORK	PHILADELPHIA	PROVIDENCE
CHICAGO	DETROIT	COLUMBUS
BOSTON	CLEVELAND	BALTIMORE
PITTSBURGH	WASHINGTON	INDIANAPOLIS

AT BOOTH Nos. 54-55 - POWER SHOW - DEC. 1-6

BAILEY

BOOTHS



See This Chart in Colors at the Power Show

December 1-6, 1924

It is a diagrammatic representation of a boiler with superheater, economizer and air heater with forced and induced draft fans to show the application of Bailey Meters.

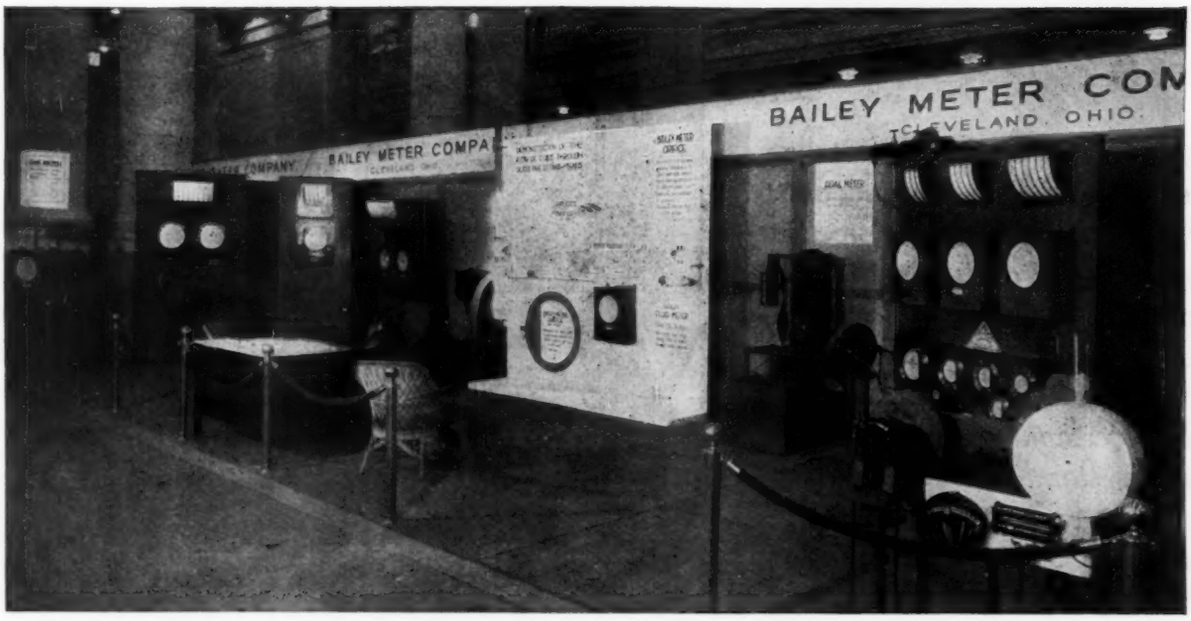
The most important information such as steam flow from the boiler, air used for combustion, stoker or pulverized coal feeder speed, temperature of the gases leaving the boiler, leaving the economizer and leaving the air heater, as well as the air leaving the air heater should be recorded. The temperature of the feed water entering and leaving the economizer as well as the superheated steam temperature are also of sufficient importance to be recorded.

Visit our booths at the power show and not only learn how the above information can be obtained with three Bailey Recorders, but inspect the actual equipment which will give you this essential data for most efficient boiler operation.

Write for data and information on Bailey Meter Equipment.

METERS

54 AND 55



Your inspection is invited of the following Bailey Meter Co. Equipment

Bailey Panel Boards upon which will be mounted the following equipment:

Bailey Boiler Meters for Steam Flow, Air Flow, Fuel Feed and Flue Gas Temperature.

Bailey Multi-Pointer Gages for draft, pressure, temperature, speed and other factors.

Totalizing Boiler Meter for double outlet boilers.

Steam Flow Meters.

Gas Meter with Pressure Compensator.

Indicating and Recording Tachometers for speeds varying from 3/5 of a R.P.M. to 6000 R.P.M.

Pressure and Temperature Recorders in various combinations.

Meters for coal and other granular material.

The application of the above equipment will be explained by the use of a large chart in color representing a modern boiler installation.

BAILEY METER COMPANY

2001 East 46th St., Cleveland, Ohio

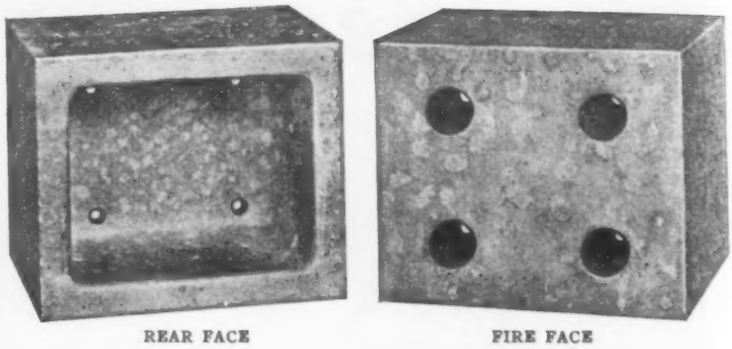
Bailey Meter Company, Ltd., 179 Delorimier Ave., Montreal

AT BOOTH No. 78-POWER SHOW-DEC. 1-6

The Philadelphia Electric Co., Delaware Station

Selecting Your Boiler Furnace Linings

Among over 2,500 installations of the Bernitz Construction, *The Philadelphia Electric Company* is one of the many companies which has selected BERNITZ CLINKER-PROOF SUPER BLOCKS, *"The Permanent Furnace Lining,"* as *standard equipment* for its boiler furnaces. The Delaware and Chester stations are *100%* equipped. Since its first order for Bernitz Blocks, this company has placed 48 repeat orders.



REAR FACE FIRE FACE

Bernitz Co. Clinker-Proof Super Block

SHAPE "SH"

(Size 9" x 7⅝" x 7" deep)

All Bernitz Super Blocks are made of genuine Carborundum and protected by the Bernitz Ventilating System. (Pat'd Oct. 11, 1921 & pending)

Why not select a lining for your furnaces which will *absolutely* eliminate clinker troubles and setting failures? A free and clear clinker zone further assures continuous operation and better combustion in your furnaces.

Our 1924 Edition catalog gives complete information. Bulletin "B-2" describes the Bernitz Super Blocks as adapted to boiler furnaces and bulletin "W.G." as adapted to water gas generator linings. Copies of above publications gladly furnished on request.

The Philadelphia Electric Co., Chester Station

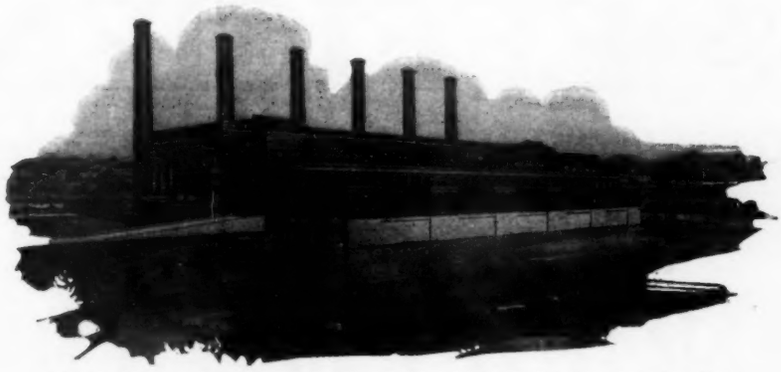
Bernitz Furnace Appliance Company

Main Office
177 State Street, Boston, Mass.

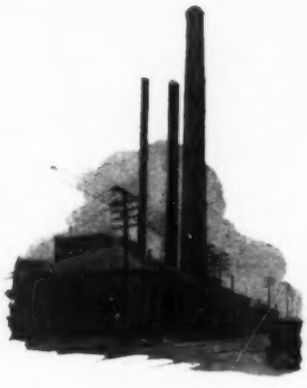
LONG LIFE TRADE BERNITZ METHOD MARK

New York Office
350 Madison Ave., New York City

Atlanta Baltimore Chicago Cleveland Detroit Philadelphia Pittsburgh St. Louis San Francisco

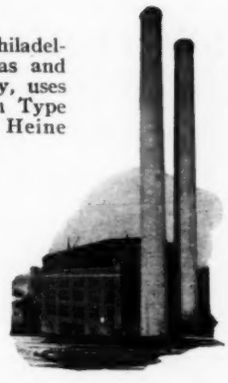


Metropolitan Power Company uses Elesco Outside Header Construction Superheaters in Connelly Boilers



Sandusky Gas and Electric Company uses Elesco Outside Header Construction Superheaters in Connelly Boilers

Cromby Station, Philadelphia Suburban Gas and Electric Company, uses Elesco Convection Type Superheaters in Heine Boilers



Why these and many other stations are Elesco Equipped

First: Multiple pass arrangement insures thorough mixing of steam so that all particles are heated uniformly. This, coupled with a true proportioning of heat-generating surfaces and steam flow areas, produces an unexcelled performance.

Second: Most flexible in design. Forged return bends permit units of any length and form necessary to meet all requirements.

Third: Only design having minimum steam joints and still maintaining a correct proportioning of steam flow areas and heating surfaces.

Fourth: Ball joints have proved most efficient for ease of inspection, ready installation and eliminating necessity of objectionable hand holes.

Fifth: Construction permits of minimum draft loss, minimum opportunity for accumulation of soot, and maximum accessibility.

THE SUPERHEATER COMPANY

17 East 42nd Street, NEW YORK — **Peoples Gas Building CHICAGO**

ELESCO

Philadelphia — **Boston** — **Pittsburgh**

Canada: The Superheater Company, Limited, Montreal

AT BOOTH No. 31 - POWER SHOW - DEC. 1-6

92.7% EFFICIENCY

Overall including boiler, water-cooled walls, stokers and economizers an outstanding triumph for

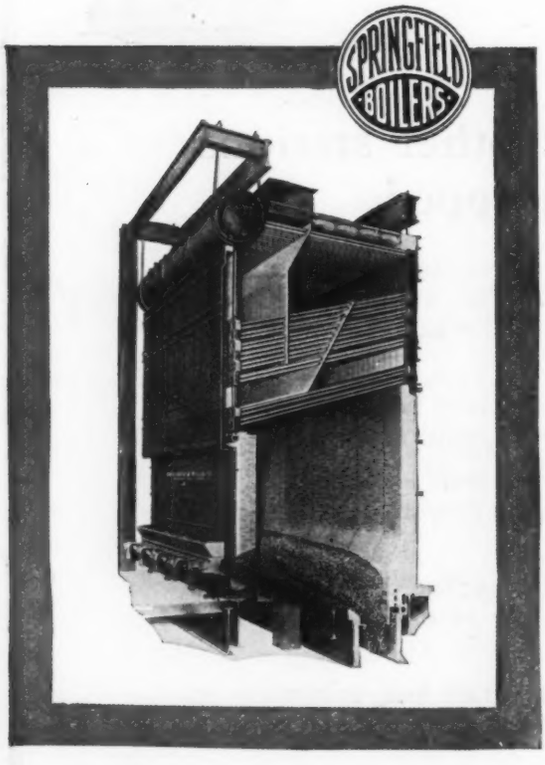
SPRINGFIELD BOILERS

SECTIONAL
ALL STEEL

No stay bolts
No bent tubes

Each **hand hole covers four tubes**

All Sizes—All Pressures



at Hell Gate

Efficiency and capacity results at Hell Gate Station of the United Electric Light and Power Co., New York City, where fifteen SPRINGFIELD boilers are in operation, give ample evidence that their operating principle is sound and scientific and that their mechanical features are correct.

The last boilers installed were equipped with underfeed type of stokers, superheaters, economizers, and water-cooled side walls, and with these units at a recent test an overall efficiency of 92.7% was obtained.

During a recent capacity test, an average rating of 461% was maintained for eleven consecutive hours, and peak of 603% was recorded.

That performance of this high grade is to be expected of SPRINGFIELD boilers is the evident conviction of Engineers who are erecting the largest stations. That they have given satisfaction where used is shown by the large share of repeat orders received by us.

Have you a catalog ?

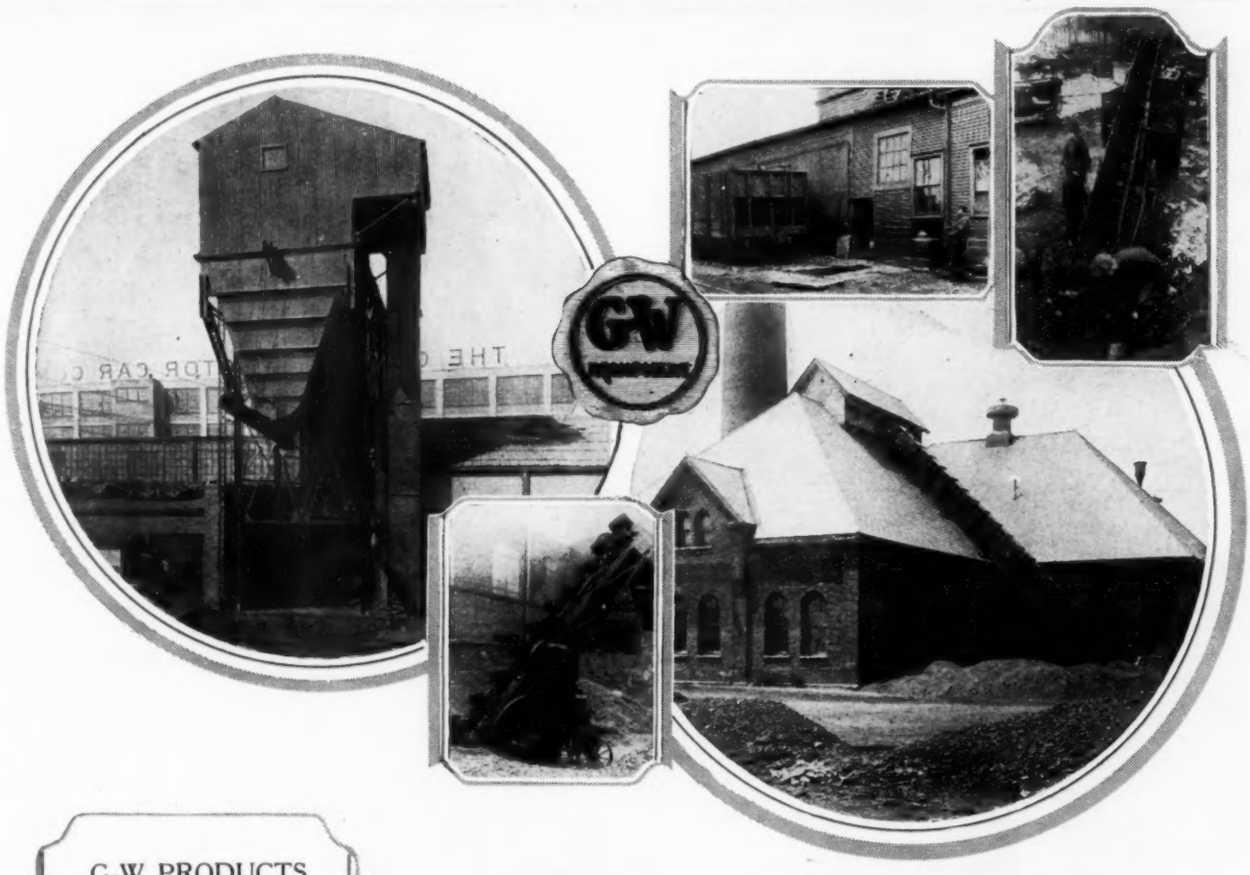
Visit Our Exhibit at Booth 31

Springfield Boiler Co.
Springfield, Ill.

OFFICES:

Cincinnati	Philadelphia	Cleveland	Minneapolis
Chicago	Pittsburgh	Buffalo	Kansas City
New York	Richmond	Detroit	Denver
Boston	Atlanta	Duluth	

603% RATING



G-W PRODUCTS

- Bucket Elevators
- Pivoted Bucket Carriers
- Elevator-Conveyors
- Flight Conveyors
- Belt Conveyors
- Power Plant Equipment
- Spouts of all kinds
- Weigh Larries
- Electric Capstan Car Pullers
- Wagon Loaders
- Portable Flight Conveyors
- Portable Belt Conveyors
- Locomotive Coaling Stations
- Coke Handling Machinery
- Mechanical Handling Equipment for all purposes

Etc.

Let's get acquainted

We'll be looking for you at the Power Show

You'll find our fellows at Booths 274 and 275, on the mezzanine floor next to the open court.

Come and discuss your coal and ash handling problems with them. They'll be there to explain how you can capitalize the advantages of G-W Mechanical Handling Equipment in any plant under your supervision.

Our engineers have a lot of "brass tacks" information you'll be glad to get—information concerning economies *that have been accomplished* in other plants and many of which can be realized in your own plant.

COME—and get acquainted with the G-W men who are always at your service.

MAIN OFFICE: 18 HILL STREET, HUDSON, N. Y.

New York: 50 Church St. Chicago: 565 W. Washington St.
Boston: 222 State St. Pittsburgh: Peoples Bank Bldg.

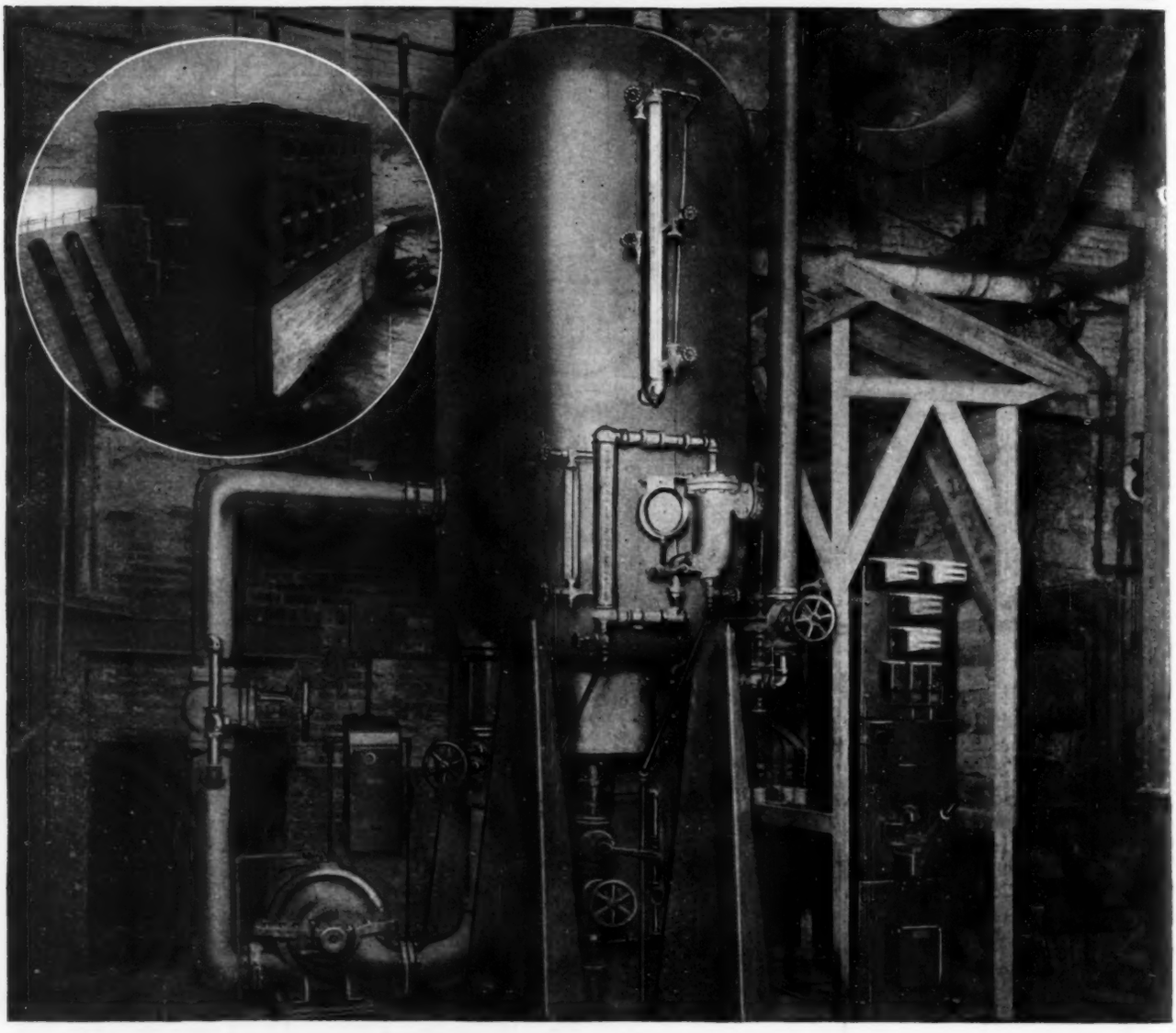
Plants: Hudson, N. Y., and Oakmont, Pa.

Gifford-Wood Co.

BUILT STRONGER LASTS LONGER

COAL HANDLING EQUIPMENT

AT BOOTH Nos. 4-5 - POWER SHOW-DEC. 1-6



Useful Steam from Waste Water Power

The G-E Electric Steam Generator makes possible the maintenance of a steam supply sufficient for night and holiday demands without operating the main boiler plant.

Utilizing as it does water power which would ordinarily be wasted, the G-E Electric Steam Generator effects a substantial reduction in operating expenses.

G-E engineers will be glad to show you how to obtain full value from your power plant by installing this equipment, which can be furnished in capacities up to 30,000 kilowatts.

Ask the G-E Sales Office nearest you for complete information covering your requirements.

General Electric Company
Schenectady, N. Y.
Sales Offices in all Large Cities

43B-850

GENERAL ELECTRIC

G-E Small Turbines

And you get more than just the Turbine

That is, you do if you belong to the big family of *G-E Turbine* users. You get the advantage of a nation-wide engineering organization.

It is desirable to have experts within easy reach to consult about matters of turbine operation. You can call in G-E Turbine specialists anytime. And they understand the problems.

Therefore, specify G-E Turbines. Specify them for driving your auxiliaries too —pumps, exciters, etc. In other words, take advantage of this G-E engineering assistance, which is at your command.

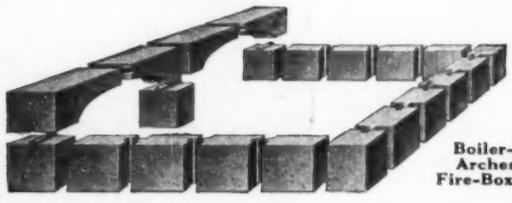
General Electric Company
Schenectady, N. Y.
Sales Offices in all Large Cities

31-47

GENERAL ELECTRIC

Boiler Furnace Economies

If you are trying to keep down expenses—and all good engineers are—you certainly ought to have the STEEL MIXTURE Bulletins in your desk. They are full of practical engineering data which you can develop into actual cash savings in furnace upkeep. Mail the coupon below and be ready to save on your next furnace lining renewal.



Boiler-Door Arches and Fire-Box Blocks

STEEL MIXTURE Boiler-Door Arches, Fire-Box Blocks, Veneer Lining and other specialties cost less because they last longer and are *easier to install* than ordinary fire brick. Shorter shut-downs; less trouble. One STEEL MIXTURE Block equals 9 to 39 fire bricks; less labor to handle and only 1/6 to 1/3 as much joint surface next to the fire. Blocks for your particular furnace are factory-assembled, inspected, numbered, and shipped with key diagram for easy assembling. These and other STEEL MIXTURE Refractories (see coupon) are fully described in the Bulletins. Check the ones which interest you and—

Mail the Coupon

McLEOD & HENRY CO.

Specialists in Furnace Refractories for 99 Years

Main Offices and Works, Troy, N. Y.

Branches: **New York, Boston, Cleveland, Detroit**

STEEL MIXTURE

REG. U.S. PAT. OFF.

McLeod & Henry Co., Troy, N. Y.

Please send Bulletins on STEEL MIXTURE Refractories for the following boiler—

Make..... Hp. .....

☐ Complete Boiler Setting.

☐ Boiler Door Arches, Fire-Box Blocks, Veneer Lining.

☐ Flat Suspended Furnace Arches. ☐ Sprung Furnace Arches.

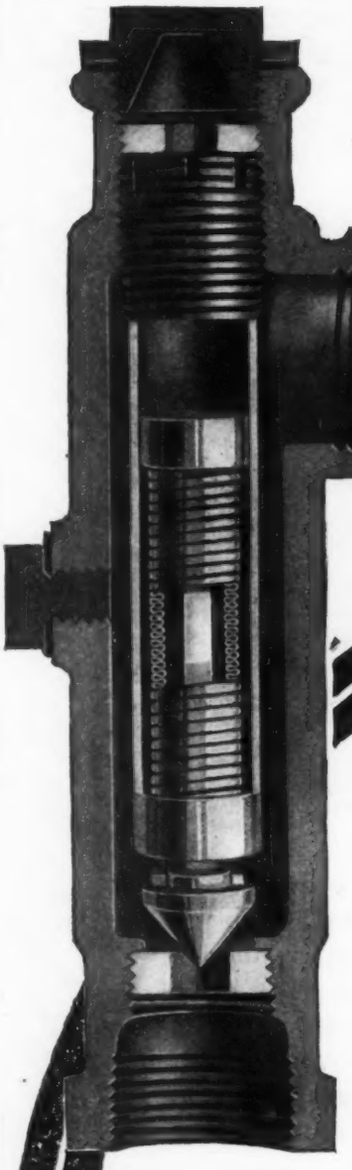
☐ Back-Combustion-Chamber Arches and Blow-Off Pipe Protectors (for h.r.t. Boilers).

☐ High Temperature Cement.

Name .....

Address .....

ME-219



TWO STEAM TRAPS FREE !

That is literally what you get when you install the Sarco. For you can purchase *three* SARCO Steam Traps for the cost of one of the "float" or "bucket" type. And a Sarco will do exactly the same work of the larger, more cumbersome, more costly makes.

The Sarco costs about one-third the price of others because we do away with complicated, unnecessary levers, gauges, packing, stuffing boxes and the like, which cost money.

STEAM TRAP SARCO

is a small, simple steam trap with only one moving part. Has no parts getting out of order or requiring frequent repair.

It can be placed anywhere on the line, at any angle. Saves floor space. Saves building a platform or digging a pit.

The Sarco is sold with the distinct understanding that it will automatically drain condensate without loss of live steam—that it will do all any other non-return trap will do. Then why pay three times the price of the Sarco, especially when you can try the Sarco for 30 days without cost to you and return it if not satisfactory.

Booklet E-3 and full particulars on request. Write today.

SARCO COMPANY, Inc.

7 Barclay Street, NEW YORK CITY

Boston Buffalo Chicago Cleveland Detroit Philadelphia
Peacock Bros., Limited—Montreal

See Our Data in 1924-25 A.S.M.E. Condensed Catalogues of Mechanical Equipment

AT BOOTH No. 485-POWER SHOW - DEC. 1-6

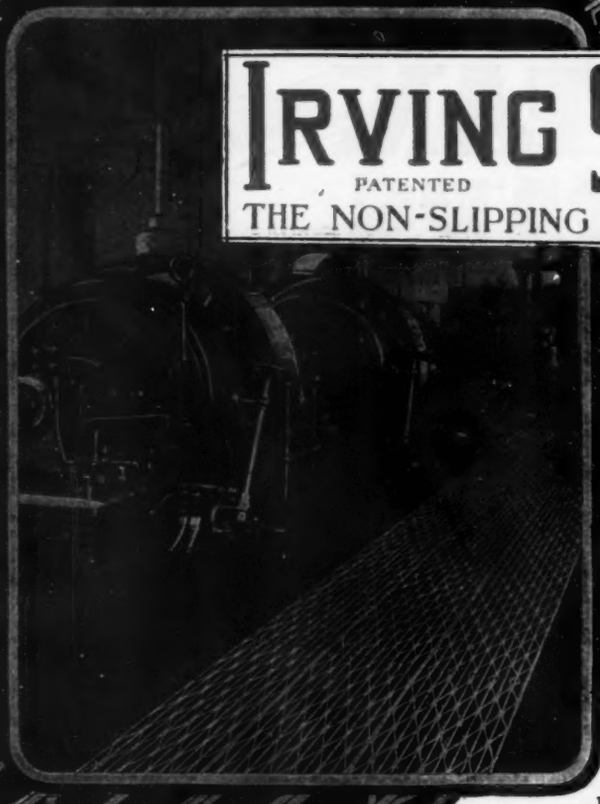
IRVING SUBWAY

TRADE MARK

PATENTED

REG U S PAT OFF

THE NON-SLIPPING OPEN STEEL FLOORING



Wear-proof, being all-steel; **slip-proof,** with a surface that oil, grease, soap, water or wear cannot make slippery; **80% open area,** for lighting and ventilation; **strong enough** for the heaviest loads; **low in first cost** and easily installed; **no after costs,** because it is time-proof; **a perfect traction surface** to push or haul loads; these distinctive features make **Subway the most economical flooring you can use.** Write for Catalog 4A34.

Exhibited in Booth 485
National Exposition of Power and Mechanical Engineering,
New York, December 1-6, 1924

IRVING IRON WORKS CO.
LONG ISLAND CITY, N.Y., U.S.A.

P-59

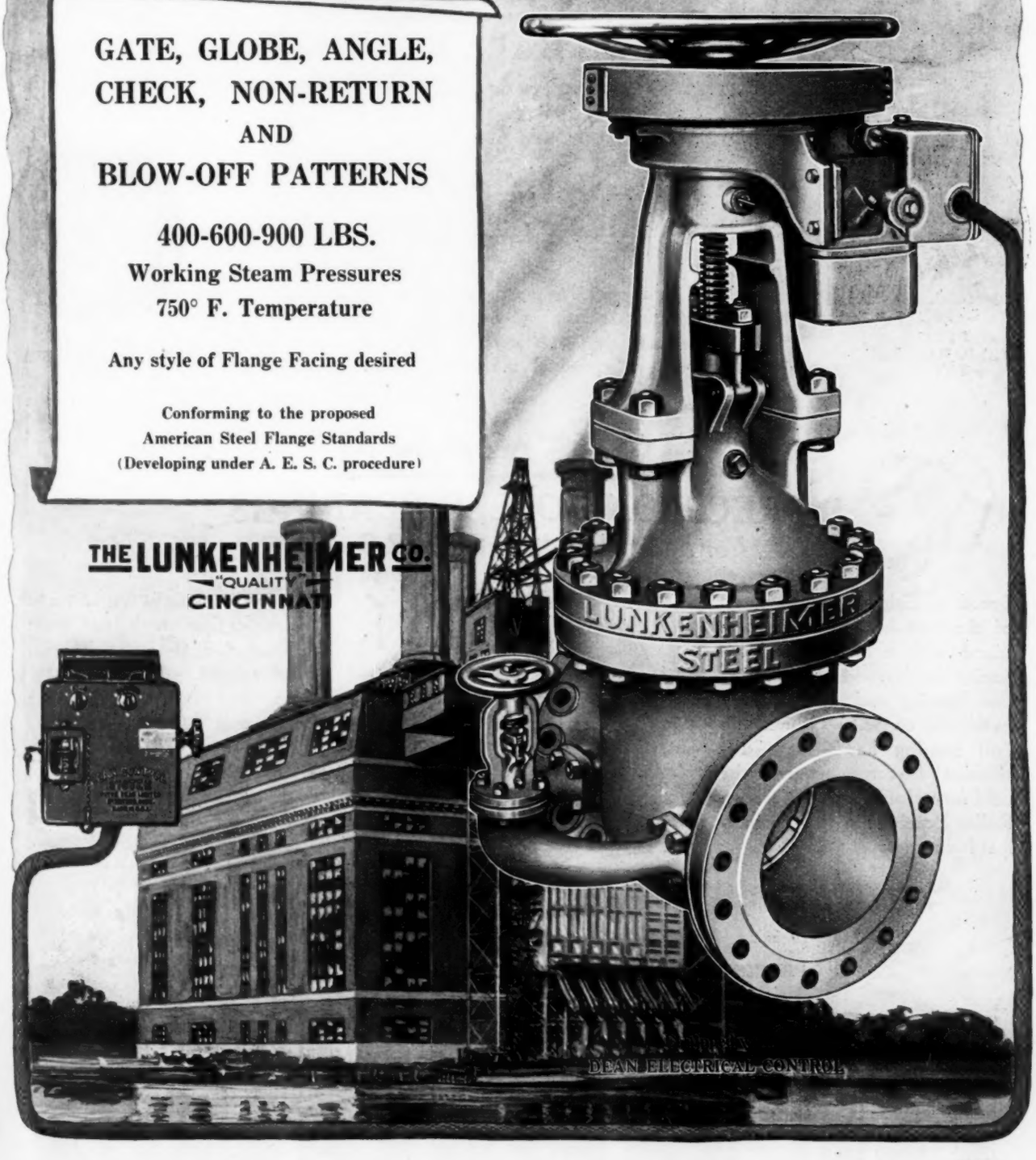
LUNKENHEIMER STEEL VALVES

GATE, GLOBE, ANGLE,
CHECK, NON-RETURN
AND
BLOW-OFF PATTERNS

400-600-900 LBS.
Working Steam Pressures
750° F. Temperature

Any style of Flange Facing desired

Conforming to the proposed
American Steel Flange Standards
(Developing under A. E. S. C. procedure)



15-23-4

AT BOOTH Nos.234-235 - POWER SHOW - DEC.1-6

PRECISION

"NORMA"

PRECISION BALL BEARINGS

For High-Speed, High-Duty Performance

OPEN (SEPARABLE) TYPE

Where the utmost of serviceability must be had under long-continued operation at high speeds—there is the recognized place of **"Norma"** Precision Bearings in the machinery world. Proved by the tests of time and service, they have been progressively bettered to meet ever harder conditions—rather than cheapened to meet low-price competition. They are daily demonstrating their superlative dependability in hundreds and hundreds of thousands of high-speed, high-duty machines where the failure of a bearing would mean losses a thousand times the cost of the original bearing equipment.

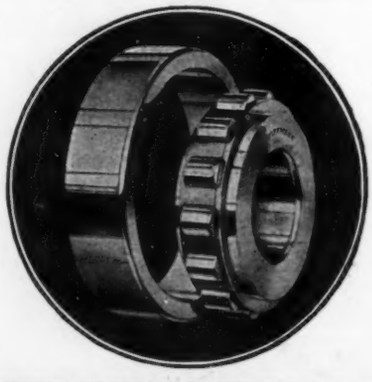
CLOSED (NON-SEPARABLE) TYPE

"HOFFMANN"

PRECISION ROLLER BEARINGS

For heavy Loads and Hard Service

Speed qualities equal to those of the best ball bearing, combined with a steady load capacity far beyond that of any ball bearing and a temporary overload capacity which no ball bearing has — these distinctive features suggest the field for **"Hoffmann"** Precision Roller Bearings in the mechanical industries.



Where the duty is hardest and the operating conditions most difficult and the necessity for stand-up-ability the greatest—there do **"Hoffmann"** Roller Bearings reveal their true value and return the dividends which justify their use. Made in standard and self-aligning types, for all speeds and powers.

NORMA-HOFFMANN BEARINGS CORPORATION

Anable Avenue Long Island City New York

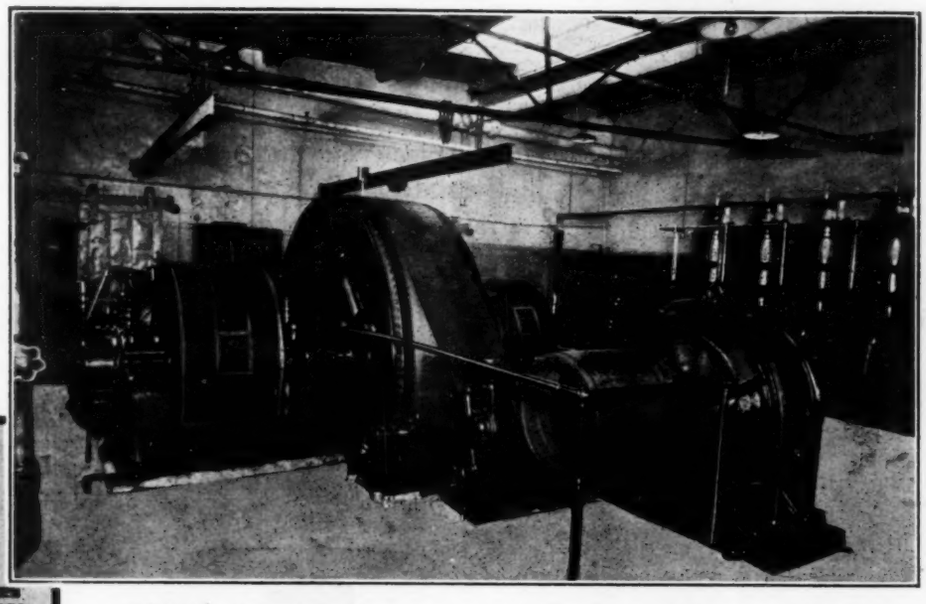
PRECISION BALL, ROLLER AND THRUST BEARINGS

BEARINGS

25% More Power from the Same Gas Engine

Saved—
31 feet of floor space

Saved—
62 feet of belting



300 HP Gas Engine driven Alternator
Engine pulley 114" diameter, 31" face,
Alternator pulley 27" diameter, 27" face.
Pulley centers 10 feet.

Five Points:

1—The Lenix increases the arc of contact between belt and pulley.

2—The Lenix maintains constantly and accurately the proper tension in the slack side of the belt.

3—The Lenix saves floor space, building space and belting because of freedom in pulley locations.

4—The Lenix saves in bearing friction, lubrication and renewal of bearings because of reduced bearing pressure.

5—The Lenix permits the use of less expensive, high speed and high efficiency motors or generators because of the higher pulley ratios.

This increase in the capacity of a 300 H.P. gas engine driven alternator is one of three highly important benefits derived by a western power company from the installation of a Lenix Drive. That company needed space for an additional unit. The Lenix reduced the floor space of 41 feet of the original layout to 10 feet. The space reduction of 31 feet enabled them to place the new unit in the same engine room. The cost of the addition to the building was saved. The new belt is approximately 62 feet shorter than the original belt and this saving in belting was more than sufficient to pay for the Lenix.

In the words of the general manager of the power company,

> *"We were able to shorten our belt centers approximately 31 feet; this has meant a great saving to us in room and permitted room for an additional unit. The drive has also been very helpful by eliminating belt slippage and belt trouble generally and increasing the capacity of the unit about 25%. It has also increased the life of our belt and we are highly pleased with the operation of this drive from that standpoint as well as the saving of space."*

The Lenix will be exhibited at the Power Show, December 1-6 at Booth 281-2 on the Mezzanine Floor. There will be a visual demonstration by the stroboscopic method of the elimination of belt slippage and increase in capacity of the Lenix short center belt drive over the ordinary open belt drive. Everyone interested in the transmission of power from one unit to another should see this demonstration and all who visit the Power Show are cordially invited.

Send for booklet *Saving Slippage and Space*

F. L. SMIDTH & CO.

50 Church St. — *ENGINEERS* — **New York, N. Y.**

THE LENIX DRIVE

(Registered)

AT BOOTH No.48 - POWER SHOW - DEC.1-6

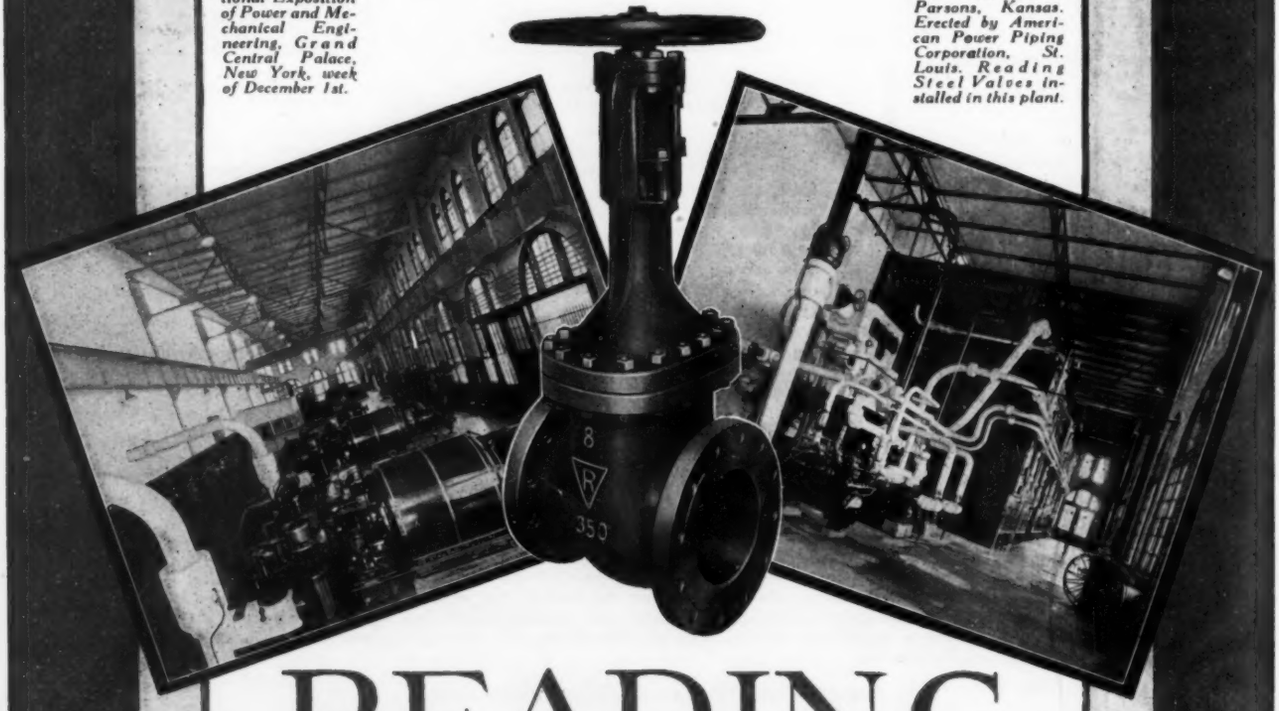
The one piece yoke and bonnet of Reading Cast Steel Valves adds strength and a straight true run for the spindle. This and the flexible connection of wedge to spindle assure easier operation and tightness at high temperatures.

READING STEEL CASTING COMPANY, Inc.
Reading Valve and Fittings Division
An Associate Company of the American Chain Company, Incorporated
929 Connecticut Ave., Bridgeport, Conn.

Boston Cleveland Hartford Philadelphia San Francisco
Chicago Detroit Houston Pittsburgh Rochester
New York

Visit Space 48 at the Third National Exposition of Power and Mechanical Engineering, Grand Central Palace, New York, week of December 1st.

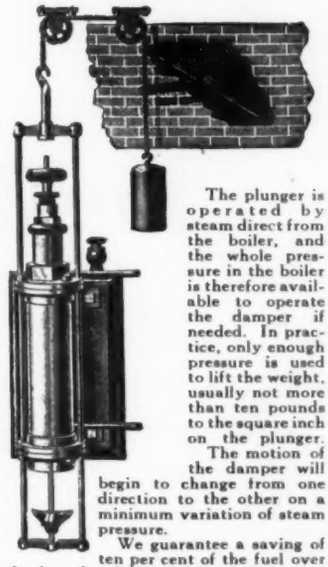
Missouri, Kansas, and Texas Plant at Parsons, Kansas. Erected by American Power Piping Corporation, St. Louis. Reading Steel Valves installed in this plant.



READING
CAST STEEL GATE VALVES

CURTIS ENGINEERING SPECIALTIES

THE CURTIS IMPROVED DAMPER REGULATOR

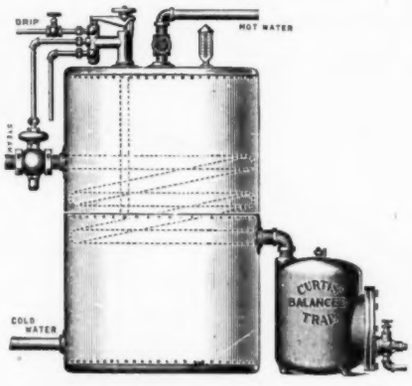


The plunger is operated by steam direct from the boiler, and the whole pressure in the boiler is therefore available to operate the damper if needed. In practice, only enough pressure is used to lift the weight, usually not more than ten pounds to the square inch on the plunger.

The motion of the damper will begin to change from one direction to the other on a minimum variation of steam pressure.

We guarantee a saving of ten per cent of the fuel over the best hand regulation, and it often reaches fifteen per cent.

CURTIS TEMPERATURE REGULATOR



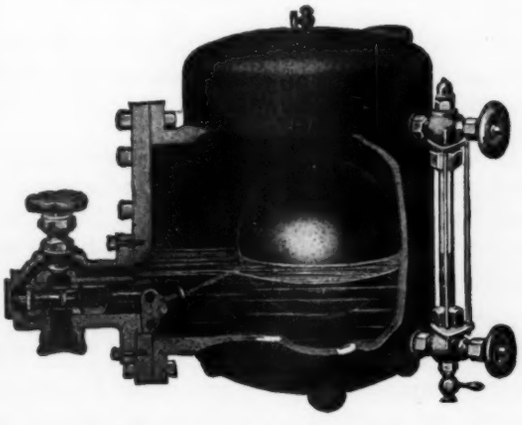
Controls any temperature from 0 to 300° F. Adapted to hot-water supply for hotels, baths and restaurants, public buildings, school houses, hospitals, dry rooms.

TYPE G STEAM PRESSURE REGULATOR

A new departure in the self contained type of Pressure Regulating Valve practice. All the internal working parts can be removed while the Valve is in the pipe line, including seats and mountings. These parts can be quickly replaced, making it very accessible, convenient and economical for overhauling or repairs.

D'ESTE

CURTIS BALANCED STEAM TRAP



A perfectly balanced and practically frictionless valve. The valves can be removed without breaking a joint, starting a gasket, or taking out a bolt. Will operate perfectly on high or low pressure.

CURTIS DIAPHRAGM AND LEVER REGULATOR

Designed to control initial pressures up to 200 lbs. and reduced pressures from 0 lbs. to 30 lbs. It is particularly adapted to conditions where the initial pressure varies considerably, or may drop to or below the reduced pressure.

All Curtis Engineering Specialties are shown in Catalog No. 53.

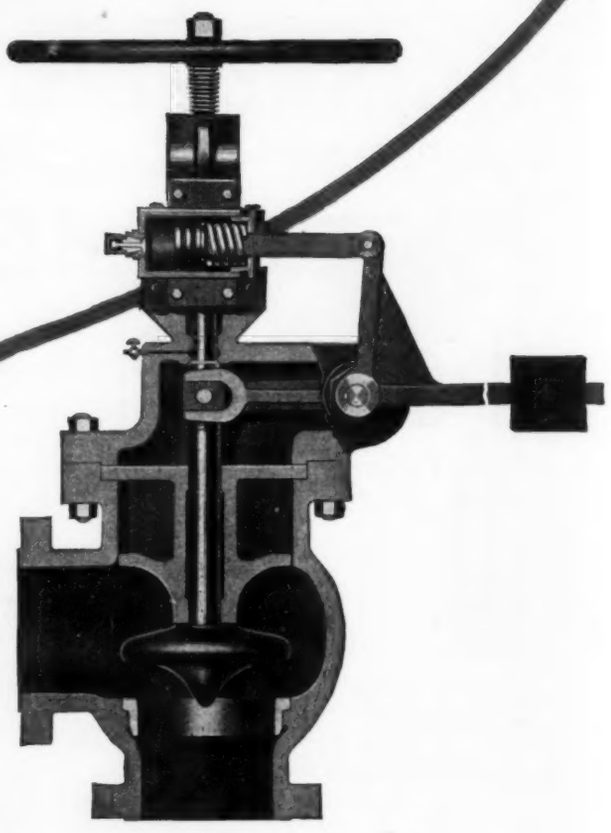
Ask for one at the Power Show or send for a copy

JULIAN D'ESTE CO. 26 Canal Street BOSTON, MASS., U. S. A.

BOIG & HILL, Inc., 180 Washington St., New York, N. Y.

Selling Agents for New York, New Jersey, Delaware and Connecticut

"Stream-Line Flow" Non-Return Valve



for
High Pressure
High Temperature
Service

Outside Indication

An indicator of the working of a Non-Return Valve is a most desirable arrangement. It furnishes an absolute check upon the condition of the Valve.

The Class "XD" Elliott-Lagonda Non-Return Valve uses an outside dashpot, with balancing and indicating arm. The arm at all times shows the position of the disc; the disc cannot move without the indicating arm being correspondingly raised or lowered.

The Class "XD" Valve has many features of design which are interesting and effective. The "Stream Line Flow" design makes for minimum pressure drop through the Valve. There are no corners or pockets; a venturi opening between seat and disc; moving parts partially balanced, not requiring support by the steam flow.

Built of high grade materials with ample factor of safety. Designed for high pressure, high temperature service.

Ask for Bulletin S-5.

At the Power Show

Elliott Company will have on display a representative showing of Elliott-Ehrhart Condensing Equipment, including cut-out models of Air Ejectors. A Deaerator will be displayed and water samples will be examined for oxygen content. Cut-out models will show the construction of Elliott-Lagonda Non-Return Valves, Faber Blow-off Valves, Strainers, and other products will be thoroughly covered.

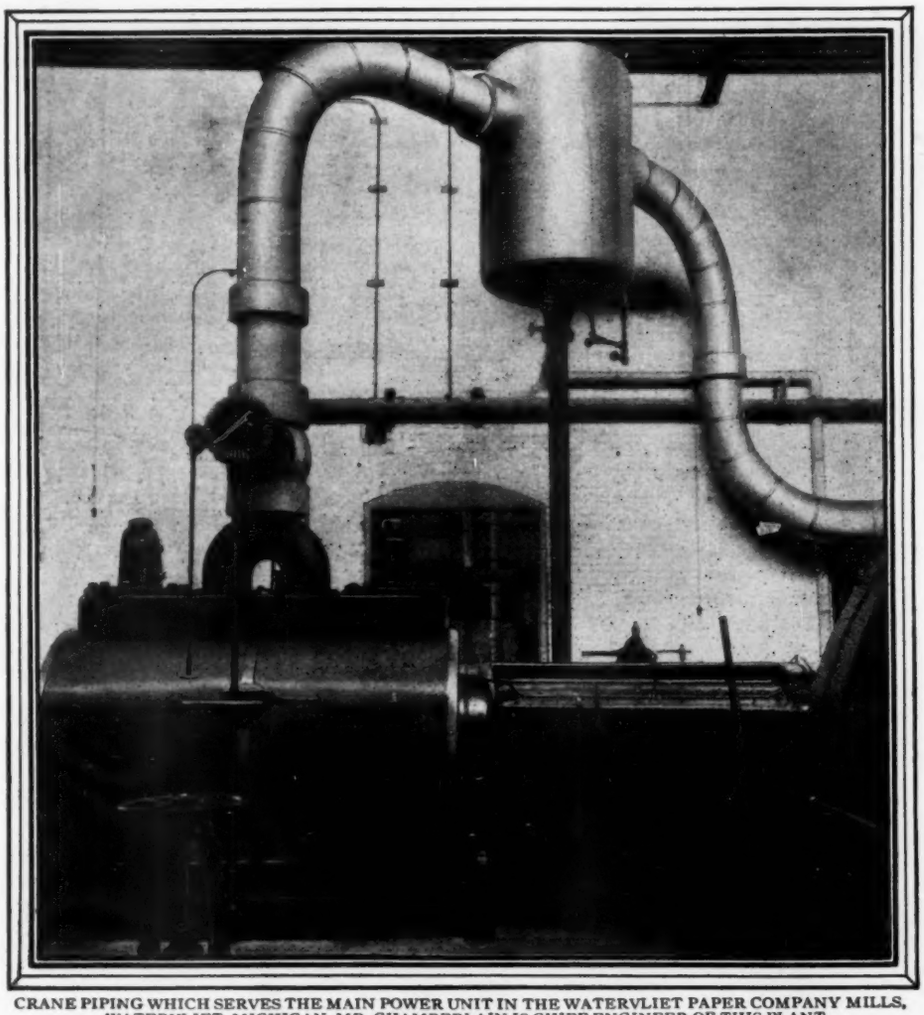
You are welcome at our booths.

ELLIOTT COMPANY

GENERAL SALES OFFICES AND WORKS
JEANNETTE, PA.
DISTRICT OFFICES: ATLANTA, BALTIMORE, BOSTON, CHICAGO, CINCINNATI, DETROIT, CLEVELAND, NEW YORK, KANSAS CITY, PHILADELPHIA, PITTSBURG, ST. LOUIS, SYRACUSE

EXECUTIVE OFFICE—PITTSBURGH, PA.
PRODUCTS
CONDENSERS, AIR EJECTORS, FILTERS, DEAERATORS, STRAINERS, SEPARATORS, GREASE EXTRACTORS, AUTOMATIC VALVES, BLOW-OFF VALVES, HEATERS

S-10 87a



CRANE PIPING WHICH SERVES THE MAIN POWER UNIT IN THE WATERVLIET PAPER COMPANY MILLS, WATERVLIET, MICHIGAN. MR. CHAMBERLAIN IS CHIEF ENGINEER OF THIS PLANT

WHERE GOOD PIPE-LINE ENGINEERING BEGINS

This huge engine gets no wet steam. Even slugs of accumulated condensation are held back by the Crane steam separator above it.

A thinking engineer has made the 18-inch separator serve another important function. By placing it in the horizontal span of the supply piping, he takes advantage of its volume to absorb any vibration in the piping. He mounted the lubricator on the separator too, so that the oil becomes thoroughly mixed with the steam before it reaches the cylinder. A provision of convenience which is appreciated by any operating engineer is the location of the wheel of the geared throttle-valve beside the exhaust valve.

Yet good design is not all. The special features of this installation are insured for their full value by the use of piping materials of proved quality. Here, as in thousands of other well-designed plants, Crane quality in valves, fittings and pipe bends satisfies every requirement of strength and durability.

CRANE

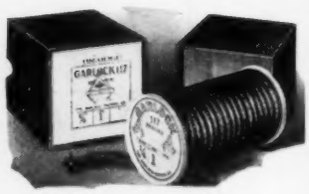
GENERAL OFFICES: CRANE BUILDING, 836 S. MICHIGAN AVENUE, CHICAGO
CRANE LIMITED: CRANE BUILDING, 386 BEAVER HALL SQUARE, MONTREAL

Branches and Sales Offices in One Hundred and Forty-eight Cities
National Exhibit Rooms: Chicago, New York, Atlantic City, San Francisco and Montreal
Works: Chicago, Bridgeport, Birmingham, Chattanooga, Trenton and Montreal

CRANE EXPORT CORPORATION: NEW YORK, SAN FRANCISCO, SHANGHAI
CRANE-BENNETT, LTD., LONDON
CIE CRANE: PARIS NANTES BRUSSEL

GARLOCK

GARLOCK SERVICE MEN *are* DIRECT FACTORY REPRESENTATIVES



SERVICE
from
Garlock Service Men

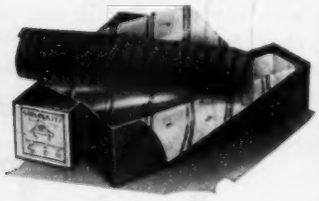
All Garlock Salesmen are trained Service Men. They understand the manufacture of packing from "The Crude to the finished Commodity." Their experience enables them to act as consulting experts on all packing problems.

The Garlock Packing Company stands back of every recommendation made by Service Men and guarantees complete packing satisfaction from their "Quality Controlled" products.

Garlock Service Men visit every Industrial community. Their advice is yours for the asking.

Don't Buy Assembled Packings

Purchase "Quality Controlled" PACKING SERVICE



THE GARLOCK PACKING COMPANY

Manufacturers of

Asbestos Rubber **GARLOCK PACKINGS** Metal Fibrous

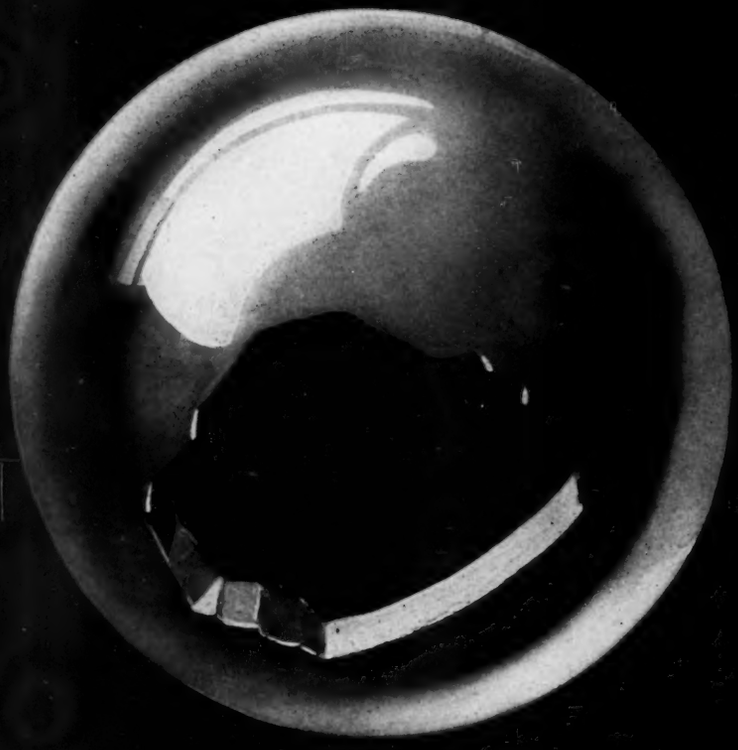
General Offices and Factories, Palmyra, New York

Canadian General Office and Factory, Hamilton, Ont.

Sales Offices and Warehouses in Principal Industrial Centers

The Ultimate Achievement

A Solid Flawless Shell of Inherent Balance



HOLOBOL

TRADE MARK

Made in Any Standard Metal

No Seams—No Joints—No Plugs

Maximum Strength—Minimum Weight

Exhibit, National Power Show, Grand Central Palace, Booth No. 544

Mfd. under Basic Patents

Hollow Metal Balls of
Maximum Strength—Minimum Weight
Inherent Balance
No Seams—No Joints—No Plugs
For Every Industrial Purpose
In All Standard Sizes from ¼" to 3"
To Any Required Accuracy

Hollow Balls in Any Standard Metal
Steel, Brass, Bronze, Copper, Monel, Stainless Steel, Aluminum

Holbols Excel Any Other Metal Balls, Hollow or Solid
For Oil and other Deep Well Pumps, Steam Pumps, Hydraulic Pumps, Boiler Feed Pumps, Spray Pumps, Injectors, Paper Pulp Pumps, Sugar Pumps, Starch Pumps, Check Valves, Globe Valves, Air Brake Valves, Pneumatic Valves, Cylinder Cocks, Ball Joints, Casters, and Bearings of all descriptions, Radial and Thrust.

HOLLOW BALL COMPANY, INC.
BALTIMORE, MARYLAND
MANUFACTURERS AND PATENTEES

Exhibit, National Power Show, Grand Central Palace, Booth No. 544

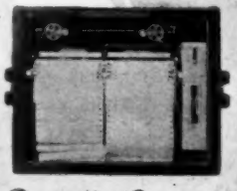
Republic Power Control Meters

Water Meter

Boiler Meter

CO_2 Recorder

Draft Indicator



Recording Pyrometer

Gas Meter

Indicating Pyrometer

Coal Meter

Republic Boiler Meter

The indicator (15″ dial) located on the boiler front tells just what the boilers are doing and enables the fireman to balance loads, and shows up any faulty conditions in the boilers. The recorders and integrators, due to the electrical operation, may be located at any distant point, such as the engineer's office.

Republic Steam Distribution Meter

This meter is especially adapted for metering steam consumed by the different departments, steam sold to outside concerns, used by turbines, etc., and all the reading instruments can be located on a central panel board.

Republic Pyrometers

Indicating and Recording, together with complete line of thermocouples and protecting tubes.

An instrument that has completed long tests for accuracy and ruggedness, and incorporates these exclusive features:

1. Separate chart arrangement, and all mechanism on swinging bracket and instantly accessible.
2. Six inch chart—wider than any other duplex.
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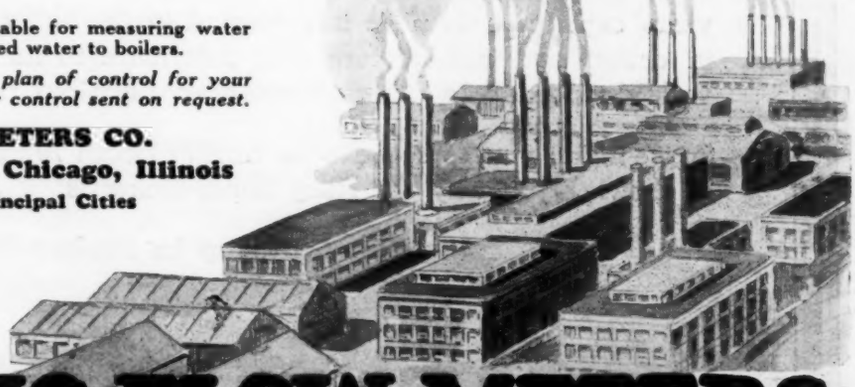
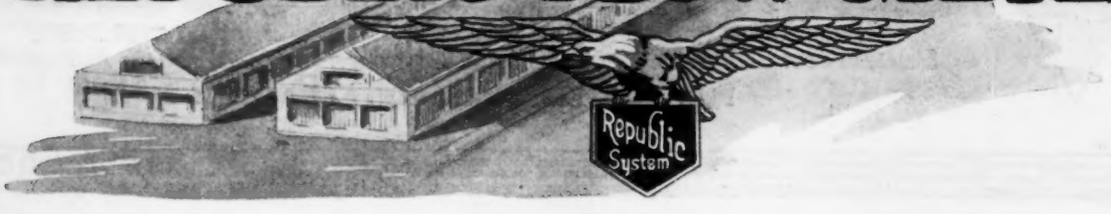
Exceptionally accurate and valuable for measuring water used in various processes, also feed water to boilers.

Let a Republic Engineer work out a plan of control for your conditions. Republic catalog on power control sent on request.

REPUBLIC FLOW METERS CO.
2232 Diversey Parkway, Chicago, Illinois
Branch Offices in 21 Principal Cities



REPUBLIC FLOW METERS

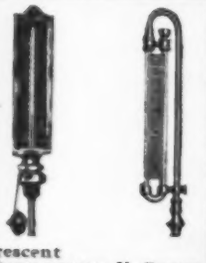


AT BOOTH No.74 - POWER SHOW - DEC.1-6

American S & B Steam Gauge

"Reform" Dial Thermometer

Columbia Recording Gauge



Crescent Thermometer U Gauge

Columbia Hand Tachometer

Generating Power Efficiently and Economically

THROUGH the many phases of generating power by steam or water, what is more essential to efficient and economical production than reliable power plant instruments —Valves, Steam Traps, etc.?

The American Schaeffer & Budenberg line is complete and *reliable*. For it is backed by nearly 75 years of practical experience in serving and solving the problems of power generation.

Instruments for indicating, recording and controlling pressures, temperatures and speeds—instruments well known for their accuracy of function and ruggedness and perfection of mechanical construction.

Pop-Safety and Relief Valves of most modern design and of proven adaptability to most severe conditions. A Steam Trap of unusual merit and capacity.

Our Catalog Set N-24 is extremely interesting and instructive. A copy is yours for the asking.

American Schaeffer & Budenberg Corporation

Succeeding
THE SCHAEFFER & BUDENBERG MFG. CO.
AMERICAN STEAM GAUGE & VALVE MFG. CO.
HOHMANN-NELSON COMPANY

BROOKLYN, N. Y.

*Boston, Buffalo, *Chicago, Cleveland, Detroit, *Los Angeles, Philadelphia, *Pittsburgh, Salt Lake City, *Seattle, Tulsa

*Stock carried at these branches

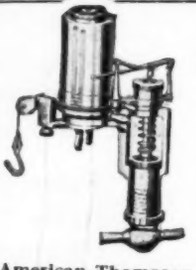
Direct Factory Representatives for Canada:
Mechanical Equipment Co.
902 New Birks Bldg., Montreal

See Our Data in 1924-25 A.S.M.E. Condensed Catalogues of Mechanical Equipment

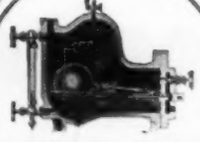
American Pop-Safety Valve

Honeco Temperature Controller

Columbia Recording Thermometer



American-Thompson Improved Indicator



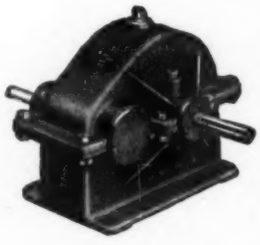
American Ideal Steam Trap

STANDARDIZED

"BOSTON GEARS"

A PRODUCT OF MERIT

BOSTON SPEED REDUCTION UNITS

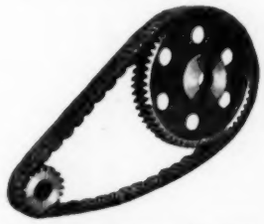


Units of ¼ to 3 H.P. are carried in stock in a variety of ratios. They are of compact and simple construction affording an economical means of obtaining an efficient reduction in a small space.

SINGLE AND DOUBLE HELICAL GEARS

These Helical Gears are of the same general specifications as our standard spur gears. They can therefore, be operated on the same shaft centers and will be found to be an ideal drive where high speed and smooth operation are necessary.

RENOLD-BOSTON SILENT CHAIN DRIVES



1 to 30 H.P. carried in stock
Larger sizes made to order

Under ideal conditions the efficiency of "R-B" Drives is 99.5%, and even under commercial conditions the efficiency will approximate 98% without appreciably diminishing **throughout their life.**

Note the chain construction:

The case hardened segmental bush
The case hardened and ground rivet
The large rivet diameter
The 140° bearing surface maintained throughout chain life
The ground link faces
The extremely simple riveted joint

Nearly 3000 sizes "BOSTON GEARS" carried in stock at
20 DISTRIBUTING POINTS

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BOSTON GEAR WORKS SALES CO.

Main Office and Factory: NORFOLK DOWNS (QUINCY), MASS.

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See our exhibit in the
Third National Exposition of Power & Mechanical Engineering
Grand Central Palace, New York
December 1 to 6, 1924

Mfd. under Basic Patents

HOLOBOL

SEAMLESS

TRADE MARK

Hollow Metal Balls of Maximum Strength—Minimum Weight Inherent Balance

No Seams—No Joints—No Plugs

For Every Industrial Purpose

In All Standard Sizes from ¼" to 3"

To Any Required Accuracy

Hollow Balls in Any Standard Metal

Steel, Brass, Bronze, Copper, Monel, Stainless Steel, Aluminum

Holbols Excel Any Other Metal Balls, Hollow or Solid

For Oil and other Deep Well Pumps, Steam Pumps, Hydraulic Pumps, Boiler Feed Pumps, Spray Pumps, Injectors, Paper Pulp Pumps, Sugar Pumps, Starch Pumps, Check Valves, Globe Valves, Air Brake Valves, Pneumatic Valves, Cylinder Cocks, Ball Joints, Casters, and Bearings of all descriptions, Radial and Thrust.

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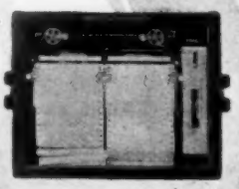

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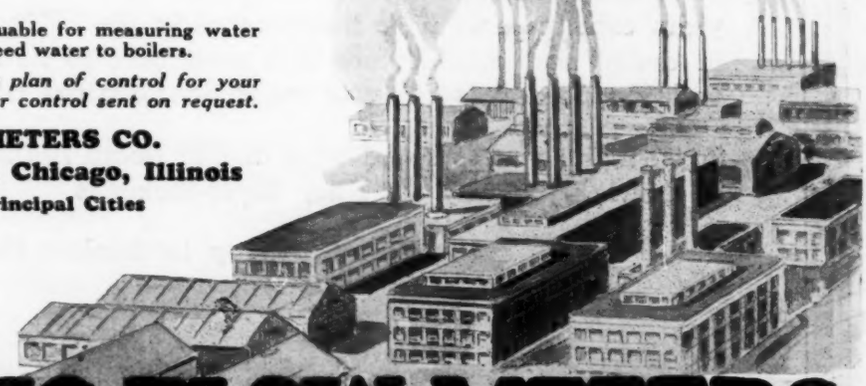
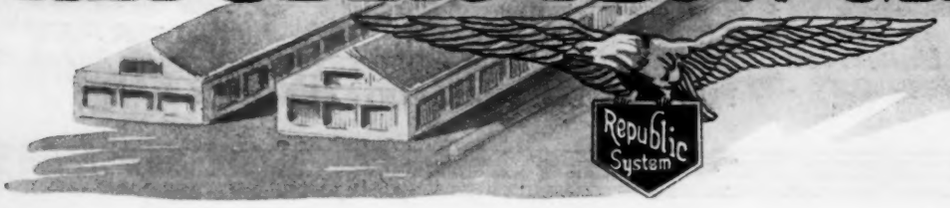


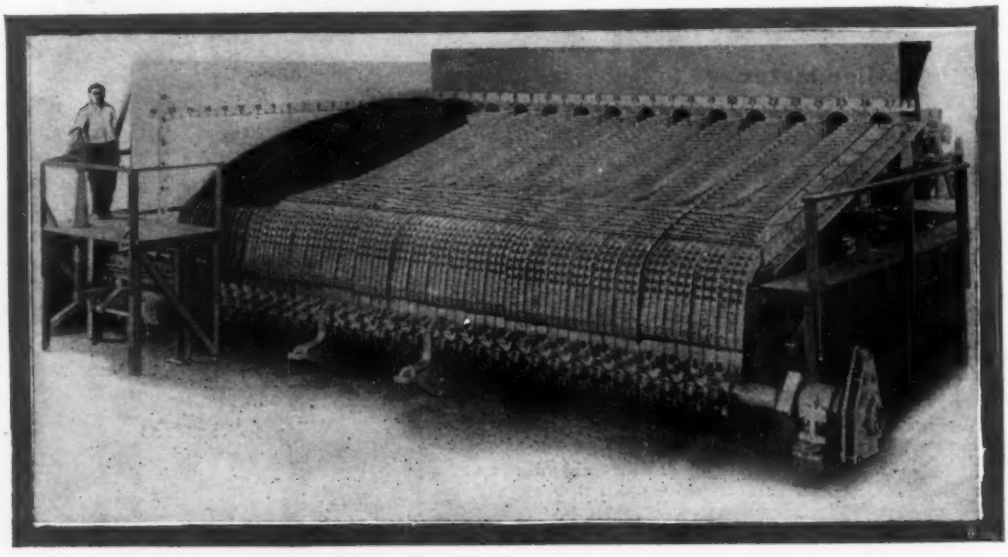
REPUBLIC FLOW METERS



AT BOOTH No.79 - POWER SHOW - DEC. 1-6

RILEY UNDERFEED SUPER-STOKER

See them in



A cordial welcome awaits you at Booth 79. Two retorts of a

RILEY SUPER-STOKER

will be shown in operation, complete in every detail.

With the knowledge of previous limitations in stoker performance gathered in many years' experience we have incorporated in the Riley Super-Stoker many refinements in design and manufacture that contribute to its remarkable record in **meeting today's demands in the most economical manner.**

So we invite you to spend some time at Booth 79 that we may have the opportunity of showing you why the Riley Super-Stoker is

"A Forward Step in Stoker Performance"

SANFORD RILEY STOKER COMPANY

SANFORD RILEY STOKER

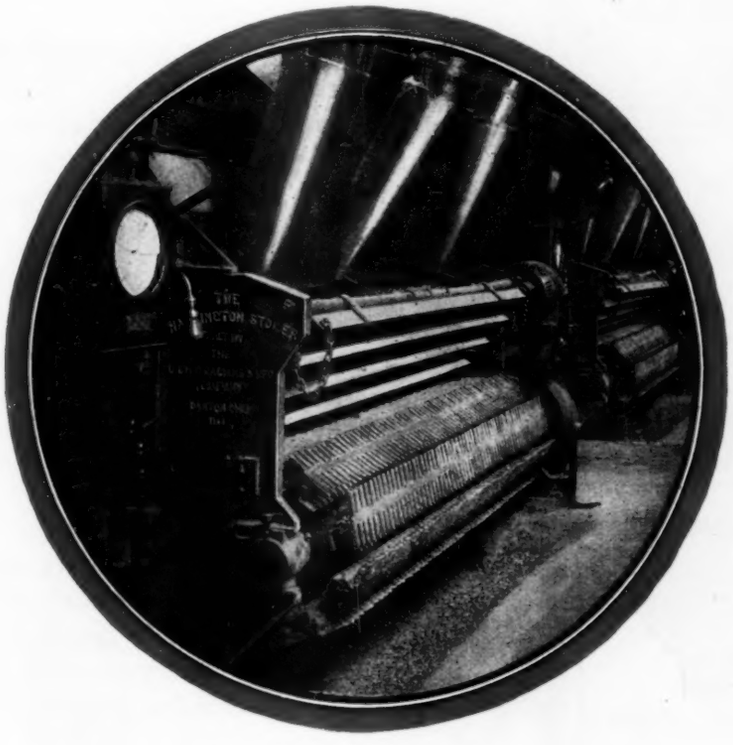
"RILEY" Underfeed Stokers — *"JONES" Underfeed Stokers* — *"MURPHY" Automatic Furnaces*

PULVERIZED COAL INSTALLATIONS

Booth 79

Next to A. S. M. E. Booth near Front Entrance

THE HARRINGTON STOKER



A complete Harrington Traveling Grate Stoker in operation will be shown at the Power Show. Take advantage of this opportunity to see this stoker and note its many points of superior and distinctive design.

"A Type for Every Stoker Need"

At the Power Show this year a Riley Super-Stoker and Harrington Traveling Grate Stoker will be shown. These are two types from our complete line of stokers which enables us to offer a "type for every stoker need," for boilers from 50 H.P. up to the largest made.

Riley Super-Stoker
Riley "Standard" Stoker
"Lateral Retort" Stoker
Jones "A-C" Stoker
Jones "Side Dump" Stoker
Jones "Standard" Stoker
"Industrial Furnace" Stoker
Murphy Automatic Furnace
Harrington Traveling Grate Stoker

COMPANY, Worcester, Mass.

BOSTON NEW YORK PHILADELPHIA PITTSBURGH BUFFALO CLEVELAND DETROIT
CINCINNATI CHICAGO ST PAUL KANSAS CITY DENVER CHARLOTTE DALLAS

The UNDERFEED STOKER COMPANY OF CANADA, LTD., TORONTO.

SANFORD RILEY STOKER COMPANY

AT BOOTH No.74 - POWER SHOW - DEC.1-6

American S & B Steam Gauge

American Pop-Safety Valve

Generating Power Efficiently and Economically

THROUGH the many phases of generating power by steam or water, what is more essential to efficient and economical production than reliable power plant instruments —Valves, Steam Traps, etc.?

The American Schaeffer & Budenberg line is complete and *reliable*. For it is backed by nearly 75 years of practical experience in serving and solving the problems of power generation.

Instruments for indicating, recording and controlling pressures, temperatures and speeds—instruments well known for their accuracy of function and ruggedness and perfection of mechanical construction.

Pop-Safety and Relief Valves of most modern design and of proven adaptability to most severe conditions. A Steam Trap of unusual merit and capacity.

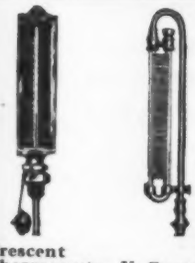
Our Catalog Set N-24 is extremely interesting and instructive. A copy is yours for the asking.

"Reform" Dial Thermometer

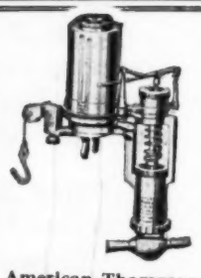
Honeco Temperature Controller

Columbia Recording Gauge

Columbia Recording Thermometer



Crescent Thermometer U Gauge



American-Thompson Improved Indicator

American Schaeffer & Budenberg Corporation

Succeeding
THE SCHAEFFER & BUDENBERG MFG. CO. AMERICAN STEAM GAUGE & VALVE MFG. CO.
HOHMANN-NELSON COMPANY

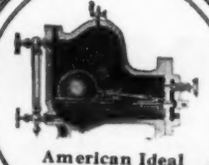
BROOKLYN, N. Y.

*Boston, Buffalo, *Chicago, Cleveland, Detroit, *Los Angeles, Philadelphia, *Pittsburgh, Salt Lake City, *Seattle, Tulsa

*Stock carried at these branches

Direct Factory Representatives for Canada:
Mechanical Equipment Co.
902 New Birks Bldg., Montreal

Columbia Hand Tachometer



American Ideal Steam Trap

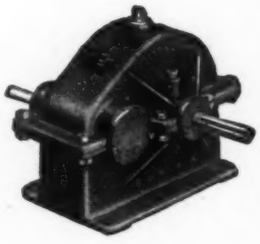
See Our Data in 1924-25 A.S.M.E. Condensed Catalogues of Mechanical Equipment

STANDARDIZED

"BOSTON GEARS"

A PRODUCT OF MERIT

BOSTON SPEED REDUCTION UNITS



Units of ¼ to 3 H.P. are carried in stock in a variety of ratios. They are of compact and simple construction affording an economical means of obtaining an efficient reduction in a small space.

SINGLE AND DOUBLE HELICAL GEARS

These Helical Gears are of the same general specifications as our standard spur gears. They can therefore, be operated on the same shaft centers and will be found to be an ideal drive where high speed and smooth operation are necessary.

RENOLD-BOSTON SILENT CHAIN DRIVES

1 to 30 H.P. carried in stock
Larger sizes made to order

Under ideal conditions the efficiency of "R-B" Drives is 99.5%, and even under commercial conditions the efficiency will approximate 98% without appreciably diminishing **throughout their life.**

Note the chain construction:

The case hardened segmental bush
The case hardened and ground rivet
The large rivet diameter
The 140° bearing surface maintained throughout chain life
The ground link faces
The extremely simple riveted joint

Nearly 3000 sizes "BOSTON GEARS" carried in stock at
20 DISTRIBUTING POINTS

ASK FOR CATALOG

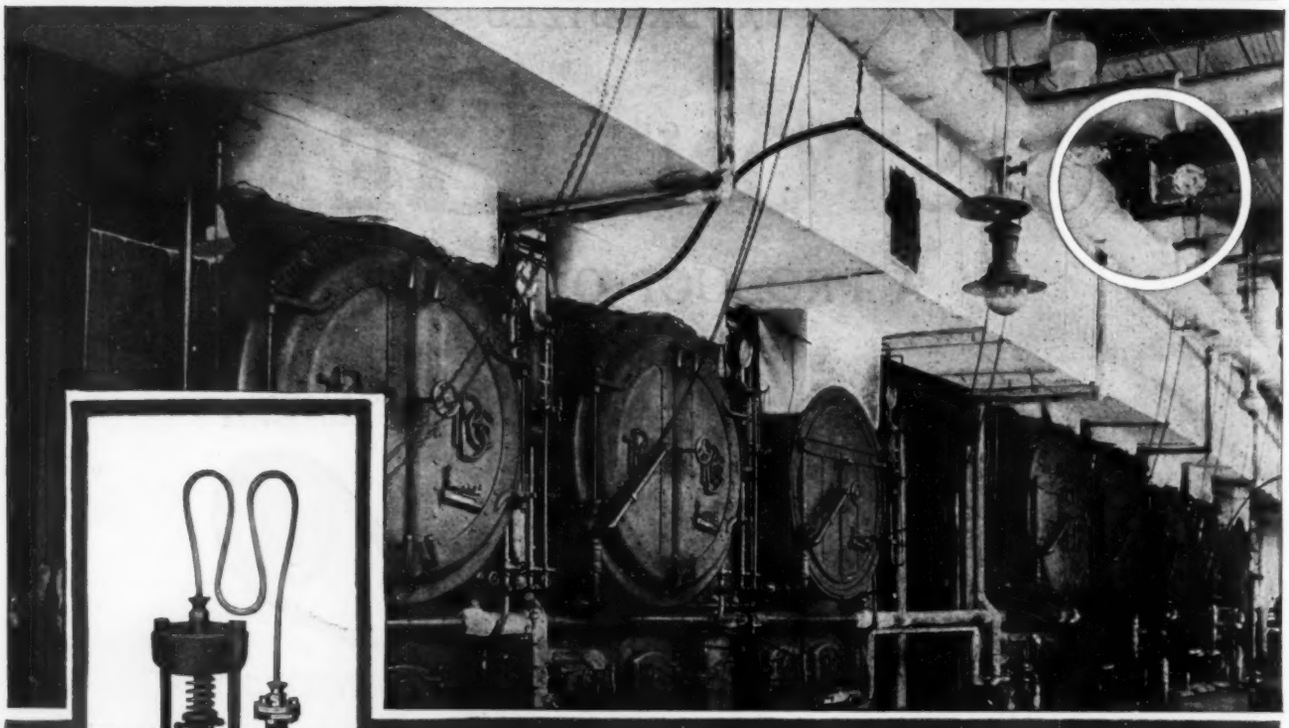
BOSTON GEAR WORKS SALES CO.

Main Office and Factory: NORFOLK DOWNS (QUINCY), MASS.

Branches: BOSTON NEW YORK CLEVELAND CHICAGO

See our exhibit in the
Third National Exposition of Power & Mechanical Engineering
Grand Central Palace, New York
December 1 to 6, 1924

AT BOOTH Nos.252 - 253 - POWER SHOW - DEC. 1-6



No. 931 Spring type for Control of Liquids. Complete as you see it here, and ready to be installed.

Illustration of Fuel Oil Burning Equipment carrying a No. 931 Sylphon Temperature Regulator Installation at the Providence Dye & Bleach Works by Petroleum Heat and Power Co.

Sylphon adds the safety factor to this mammoth fuel oil job

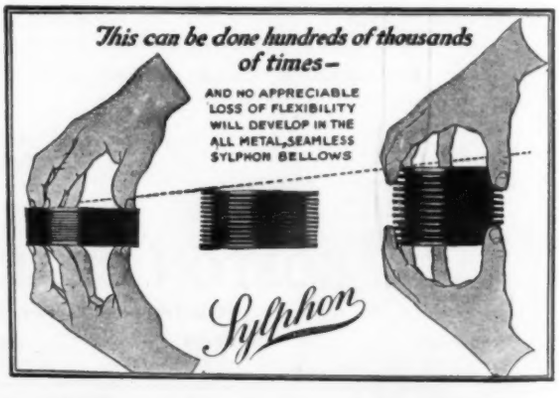
INSTALLED on the Secondary Heater, a Sylphon Temperature Regulator adds a great factor of safety, and by automatically regulating the temperature of the oil at 150° to 160°F (normally), delivers it at the most efficient atomatizing temperature.

On an oil supply tank, a Sylphon Temperature Regulator, by automatically regulating the oil to a temperature (normally) of 100° to 110°F, safeguards against the generation of gases in the tank, makes for easy pumping and big steam savings.

The secret of the accurate Sylphon control is the Sylphon Bellows

This bellows, in the head of the instrument, is drawn from a flat sheet of metal, *without soldered seam.* Complete in one piece, and so sensitive to the slightest change in temperature that it (by being expanded and contracted) always opens or closes the valve in the steam line, thus maintaining the desired temperature in the secondary heater and storage oil tank.

Let us send you Bulletin QTR-103



THE FULTON COMPANY KNOXVILLE, TENN.

New York Chicago Detroit Boston Philadelphia *Representatives in all Principal Cities in U. S.*

European Representatives:
Crosby Valve & Engineering Co., Ltd., 41-42 Foley Street, London, W. I., England

Canadian Representatives:
Darling Bros., Ltd., 120 Prince Street, Montreal, Canada

"PENNSYLVANIA"

The "PENNSYLVANIA" ARMORFRAME embodies the accepted Single Roll principle of Coal Crushing, in unbreakable STEEL CONSTRUCTION

Coal Crushers for Central Stations, Gas Works and Industrial Power Plants, deserve the same engineering scrutiny, independent of other equipment, with which the principal units of modern Power Plant apparatus are selected.

What is more fundamental than a crusher that will deliver an uninterrupted supply of properly prepared coal?

Patent pending

Patented

"PENNSYLVANIA" ARMORFRAME CRUSHER

The "Pennsylvania" ARMORFRAME with side housings of 30" Bethlehem girder beams, is the notable achievement of more than 30 years of Single Roll Crusher development.

An unbreakable frame, combined with spring controlled breakerplate and steel shear pin safety device affords triple tramp iron protection.

This powerful fabricated construction, cast steel bearing housings, die cast interchangeable bushings and patented segmental roll have been successfully combined to afford the unfailing coal crusher reliability, so long desired by engineers and operators for this exacting service.

"PENNSYLVANIA" COAL PREPARATION MACHINERY

BRADFORD BREAKERS for crushing, sizing and cleaning large tonnages.
STEELBUILT HAMMERMILLS for fine crushing for By-Product coking.
ARMORFRAME Single Roll Crushers for medium and small size plants.

Put your Coal Preparation Problems up to us.

General Offices
Stephen Girard Bldg., PHILADELPHIA

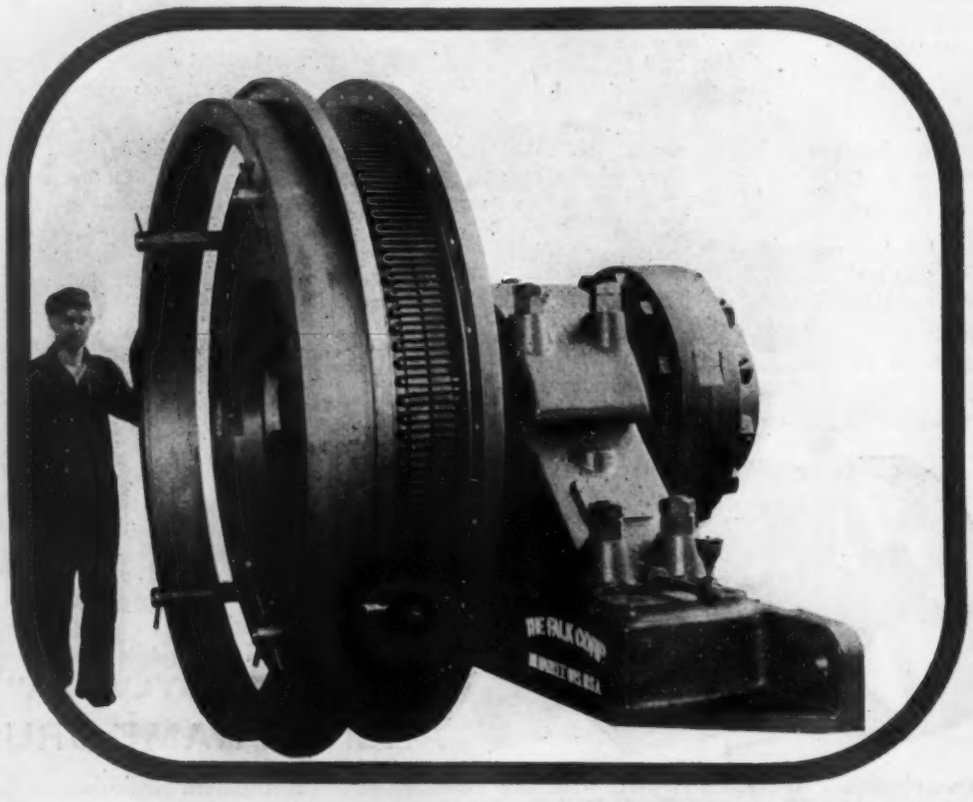
PENNSYLVANIA CRUSHER COMPANY

Branch Offices
New York Pittsburgh Chicago London

STEELBUILT CRUSHERS

AT BOOTH Nos. 338-339-POWER SHOW-DEC. 1-6

FALK

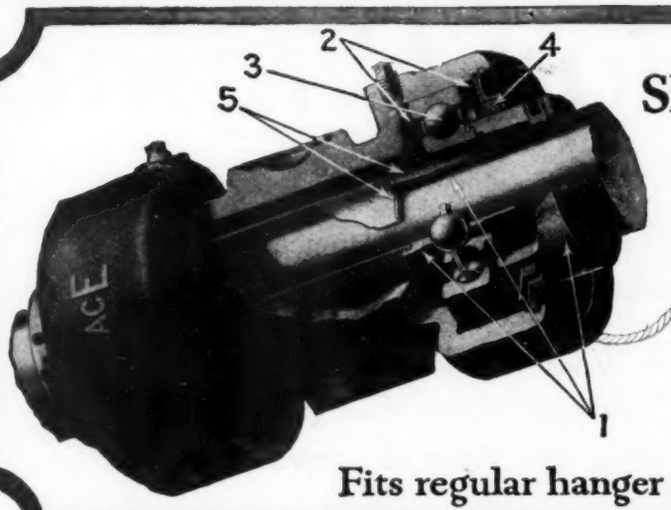


Transmitting a torque of approximately 1,000,000 pound feet—Falk-Bibby Coupling for reversing blooming mill at Central Steel Company, Massillon, O.

Falk-Bibby Flexible Couplings
Falk Herringbone Gears
Falk Heavy Duty Oil Engines

The Falk Corporation—Milwaukee

New York Representative
M. P. Fillingham
50 Church St.



SKAYEF REEPLACE BOX

Designed to meet conditions where it may be impractical to remove present hanger frames

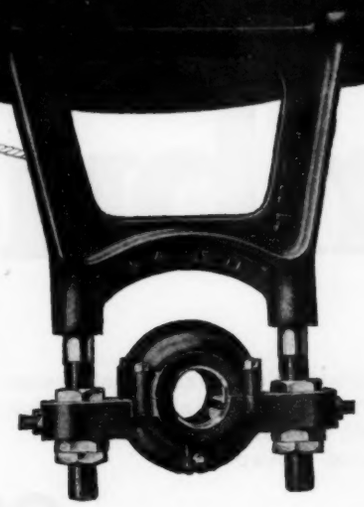
Fits regular hanger frames of corresponding size

1. **It is securely clamped to shaft by means of taper adapter sleeves and lock nuts—No play between shaft and sleeves.**
2. **It takes care of shaft contraction and expansion.**
3. **It requires no bearing adjustment.**
4. **It keeps dirt out and lubricant in.**
5. **It possesses the maximum in flexibility and adaptability though it is not self-aligning.**

THE Skayef Self-Aligning Ball Bearing Hanger illustrated below has been used in numerous industries in practically every country throughout the world and has achieved undisputed supremacy by over fourteen years of satisfactory service. It is the only ball bearing hanger which possesses within the bearing itself, the true self-aligning feature.

1256

it's SELF ALIGNING



Skayef Hanger with Self Aligning Ball Bearing Dependable and Efficient

Made Under

SKF

Supervision

THE SKAYEF BALL BEARING COMPANY - - - - 165 Broadway, New York City

AT BOOTH Nos. 23-24-25-POWER SHOW-DEC. 1-6

Combustion Engineeri

As usual, interest in combustion developments will center around Booths 23-24-25.

C-E Finn Furnace Walls will be on exhibition for the first time. Their performance during the past year has made them the topic of conversation among engineers.

Combustion Engineering Exhibit 1923 Power Show

Combustion

Corp atio

Lopulco Pulverized Fuel System
Frederick Multiple Retort Stoker
Self Contained Stoker
Coxe Stoker

Type E Stoker
Type D Stoker
Type K Stoker
Type H Stoker

43 Broad Street, New York

Offices in Principal Cities Thr

ring at the Power Show

Frederick Stokers

The stoker with 100% active grate area. First exhibited last year.

C-E Air Heaters

Savers of waste gas and producers of better furnace conditions.

Lopulco Systems

Coal, oil, gas may be burned simultaneously in the same furnace.

Coxe Stokers

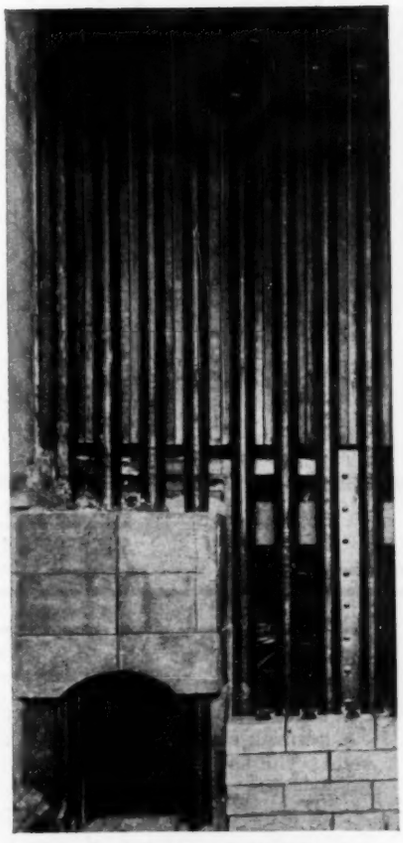
"Burns anything that is black."

Type E Stoker

The dependable stoker.

Green Stokers

The natural draft chain grate stoker.



C-E Fin Furnace Walls

Engineering

ation

Green Chain Grate Stoker
Green Cast Iron Hopper
C-E Fin Furnaces
Combusco Ash Conveyor

Quinn Oil Burning Equipment
Grieve Grate
Air Heater
CEC Tube Scraping Device

INTERNATIONAL COMBUSTION ENGINEERING CORPORATION

Throughout the World

AT BOOTH No. 240 - POWER SHOW - DEC. 1-6

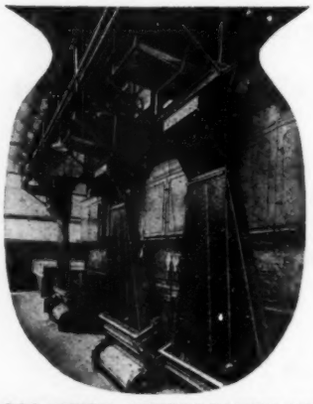
ACCURATELY and AUTOMATICALLY

CHECKING THE BASIC COST OF POWER

with

Richardson Apron Feed Automatic Coal Scales

Continuously recording the exact weight of coal consumed by each boiler—working constantly in unison with automatic stokers—providing a careful accounting of the total weight of coal consumed per shift or per day—



Furnishing positive operating data from which may be determined the coal cost per Horse Power developed—A means of checking boilers and shifts against each other—

INDIVIDUAL RICHARDSON APRON FEED AUTOMATIC COAL SCALES.
RICHARDSON APRON FEED AUTOMATIC COAL WEIGH LARRIES. Motor or hand propelled.
RICHARDSON motor or hand propelled HAND WEIGHING COAL LARRIES.

RICHARDSON SCALE COMPANY -:- -:- PASSAIC, N. J.

NEW YORK CHICAGO BOSTON MINNEAPOLIS OMAHA
WICHITA MEMPHIS HOUSTON PASADENA PITTSBURGH
HAVANA, CUBA

AT BOOTH No. 76 - POWER SHOW - DEC. 1-6

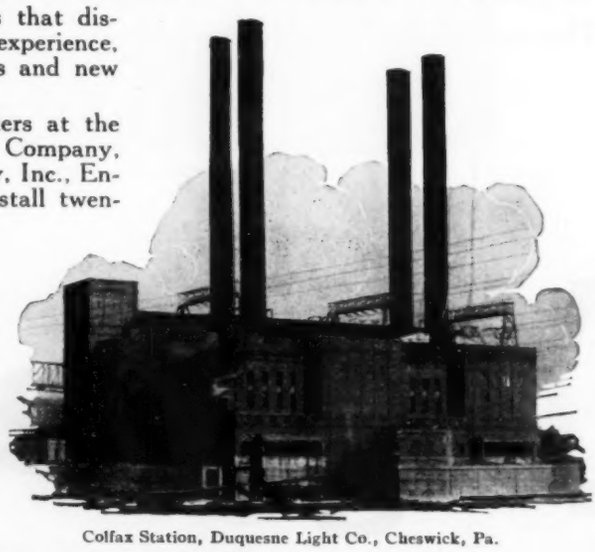
SIMPLEX BOILER FEED METERS

THE best evidence of the merits of a device is that discerning engineers and users, after some years' experience, select the same apparatus for future extensions and new installations.

After four years' experience with Simplex Meters at the Colfax Power Station of the Duquesne Light Company, Cheswick, Pa., (Dwight P. Robinson & Company, Inc., Engineers and Constructors), it was decided to install twenty-one more of the same type in the extension to this plant, making a total of fifty-five Simplex Meters in this one station alone.

Simplex Meters indicate, record and register the flow of boiler feed water. Their record of many years of satisfactory service in the leading power plants in the country warrants their adoption for your boiler room.

The daily chart records are of special value in checking results obtained under all service conditions and are indispensable to proper supervision.



Colfax Station, Duquesne Light Co., Cheswick, Pa.

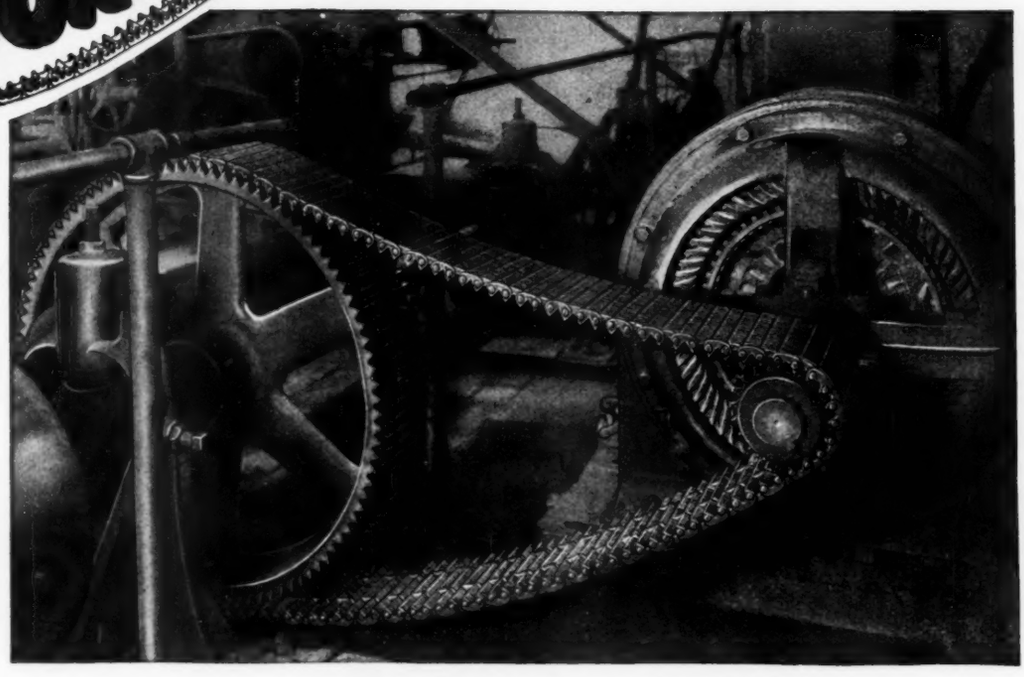
Let us explain in detail how they can serve you.

"Simplex Installations Give Satisfaction"

SIMPLEX VALVE & METER CO., 5721 Race Street, PHILADELPHIA, PA.

Boston, Mass., Geo. W. Stetson, 141 Milk St.
New York City, W. K. Sowdon, 280 Madison Ave.
Pittsburgh, Pa., C. C. Behney Union Bank Bldg.
Chicago, Ill., A. F. Barron, Room 1510, 30 North Michigan Boulevard.
San Francisco and Los Angeles, Cal., Water Works Supply Co.
Canada, Francis Hankin & Co., Montreal and Toronto, Ont.
Kansas City, Mo., C. T. McFarland, 307 Mutual Building.
Cleveland, O., A. MacLachlan, Union Trust Bldg.
Milwaukee, Wis., Fred H. Dorner.
Salt Lake City, D. C. Dunbar Co.
Atlanta, Ga., W. J. Neville, Candler Bldg.

MORSE SILENT CHAIN DRIVES



75 H.P. Morse Silent Chain Driving from motor to line shaft.

Transmitting power 98.6% efficiently under heavy service conditions

In plants where large amounts of power must be transmitted under severe operating conditions, Morse Silent Chain Drives have conclusively established their trustworthiness.

They transmit 98.6% of the developed motor horsepower year in and year out, and sustain this efficiency thruout the life of the drive. They do not slip, chatter or wear with age, and are sufficiently flexible and elastic to absorb or cushion all shocks and jars due to starting, stopping or sudden overloads. They protect bearings, motor armatures and other rotating parts against the excessive wear and tear customarily experienced with other forms of drive.

Morse Chains maintain steady uniform sprocket and chain speeds, permit a high ratio of speed reduction in a single drive, and can use standard speed motors to operate machines at the most desirable speeds.

Morse Silent Chains may be operated on short or long centers as most convenient. They run slack and therefore without excessive journal friction, and may be used in hot, cold or damp places without deterioration. They require only little lubrication at infrequent intervals.

Let Morse Engineers tell you more about these 98.6% efficient drives and the unusual economy they always give under severe operating conditions.

Be sure to visit our Booth No. 265 at the Third National Power Show, Grand Central Palace, Dec. 1 to 6 inclusive.

MORSE CHAIN CO., ITHACA, N. Y.

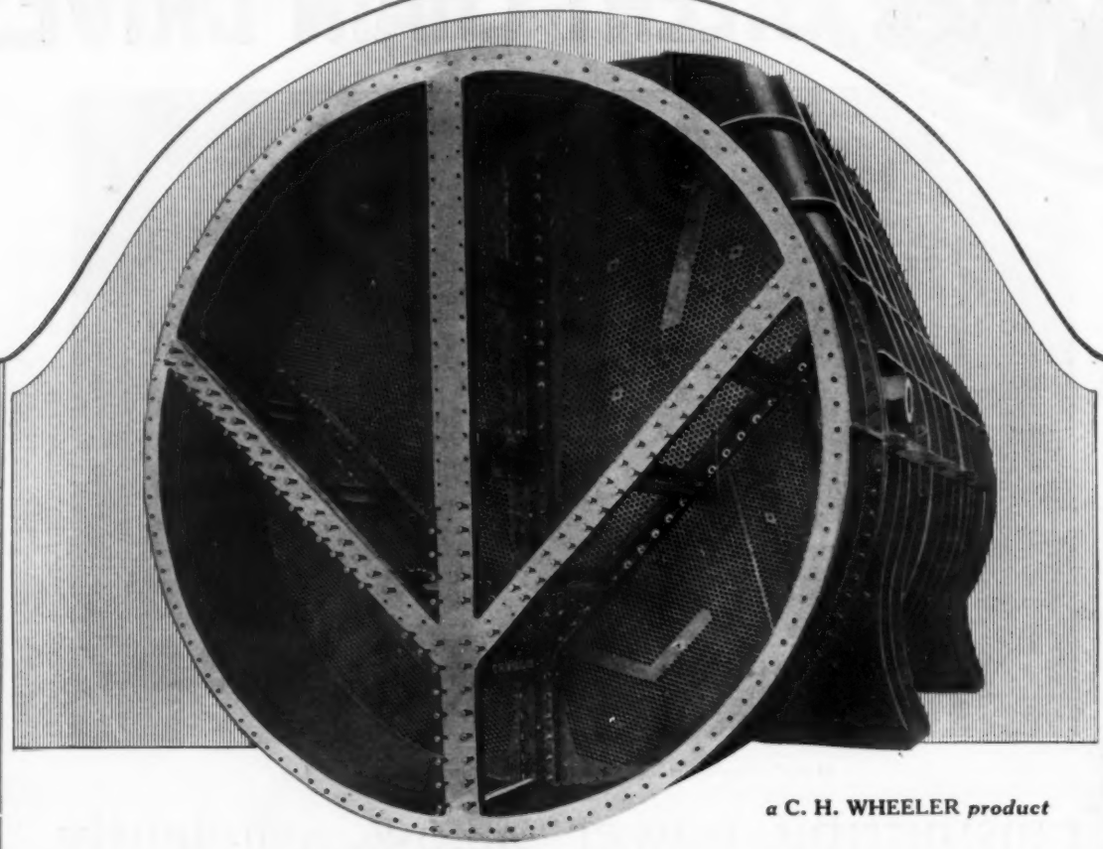
There is a Morse Engineer near you

ATLANTA, GA.....702 Candler Bldg., Earl F. Scott & Co.	NEW YORK CITY.....Room 1871, 50 Church Street
BALTIMORE, MD.....1402 Lexington Bldg.	MINNEAPOLIS, MINN.,413 Third St., S., Strong-Scott Mfg. Co.
BOSTON, MASS.....141 Milk Street	PHILADELPHIA, PA.....Room 803, Peoples Bank Bldg.
CHARLOTTE, N. C.....404 Commercial Bank Bldg.	PITTSBURGH, PA.....Westinghouse Bldg.
CHICAGO, ILL.....Room 803, 112 West Adams St.	SAN FRANCISCO, CAL.....Monadnock Bldg.
CLEVELAND, OHIO.....421 Engineers Bldg.	ST. LOUIS, MO...Railway Exchange Bldg., Morse Chain Co.
DENVER, COLO.....211 Ideal Bldg.	TORONTO, ONT., CAN.....Strong-Scott Mfg. Co.
DETROIT, MICH.....7601 Central Avenue	WINNIPEG, MAN.....Dufferin St., Strong-Scott Mfg. Co.

See Our Data in 1924-25 A.S.M.E. Condensed Catalogues of Mechanical Equipment

2170-30

AT BOOTH No. 77-POWER SHOW-DEC. 1 - 6



a C. H. WHEELER *product*

A water circulating path containing 53,000 sq. ft. of cooling surface for No. 3 Unit at Cahokia, 4th Unit now building

Designed and built by the C. H. Wheeler Manufacturing Company, for installation under the new 30,000 kw. turbine in the second section of the Cahokia Power Station at East St. Louis, Ill., McClellan & Junkersfeld Co., Inc., Engineers and Constructors. All the auxiliaries required to operate this immense condenser will likewise be of C. H. Wheeler manufacture.

We are prepared to submit complete condenser data and to make our recommendations for your condenser requirements, without obligation.

We will be pleased to study your operating conditions and to submit our recommendation for the most efficient type and size condenser for your plant.

C. H. WHEELER MFG. CO.,
19th St., Lehigh and Sedgley Aves.,
Philadelphia, Pa.

Ask C.H.Wheeler of Philadelphia about

Surface Condensers
Jet Condensers
Barometric Condensers
Vacuum Pumps
Exhaust Connections
Cooling Towers

"C.H.Wheeler of Philadelphia"

CHAPMAN

Here is the answer to your demand for a tough hard steel for high pressure steam valves—

CHAPMAN CHROME NICKEL STEEL

Chapman Cast Steel Gate Valve, Wedge Type. Bodies and Caps, cast steel, spindles of rolled monel, spindle seats and seat rings, cast monel. Valves to 6 in. incl., solid monel plugs 7 in. up, cast steel plug, monel faced. Long neck caps allow radiation, lengthen packing life. Hand, hydraulic, electric operation. Backed by 5-year guarantee.

Write for Pamphlet describing the manufacture and physical properties of Electric Steel, as produced in the Chapman plant.

A Chapman product, made in our own electric steel furnaces, under our own supervision—a steel of exceptional cleanliness, uniformity, close grain, fine dense structure.

Chapman Chrome Nickel Steel Valves will be on display at the Power Show—Space No. 2.

The Chapman Valve Mfg. Co., Indian Orchard, Mass.

BRANCHES:

New York, Pittsburgh, Detroit, Chicago, San Francisco, Houston, Milwaukee, Boston, Philadelphia, Cleveland, Los Angeles, Tulsa, Syracuse

VALVES

AT BOOTH No. 45 - POWER SHOW-DEC. 1-6

APEX CO_2 RECORDER

IDEAL FOR THE SMALL PLANT

Simple *Accurate*

Inexpensive

Send for bulletin describing this new instrument.

UEHLING INSTRUMENT CO., 479 Getty Ave. Paterson, N.J.

See the COPPUS Exhibit

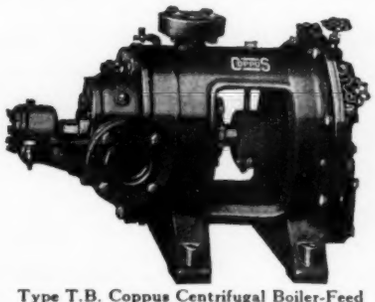
REGISTERED U.S. PAT. OFFICE

in Booth 32 Power Show Dec. 1st to 6th Grand Central Palace, New York

showing the latest and most approved Coppus Power Plant Auxiliaries,

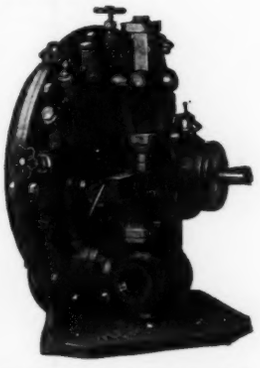
Type C Coppus Undergrate Blower

If you fire by hand, a Coppus Type "C" Blower in your boiler wall will show a marked fuel saving and insure a higher steaming capacity and steady pressure. Takes no floor space.



Type T.B. Coppus Centrifugal Boiler-Feed Pump, Multi-Stage

described in brief below. And our engineers will gladly tell you more.



Type T.C. Coppus Steam Turbine. 2 row velocity stage impulse type up to 50 brake H.P.

The Coppus Turbo Feed Pump insures *to the small and medium sized plant* the high efficiency, even feed pressure and other advantages resulting from the use of centrifugal feed pumps.

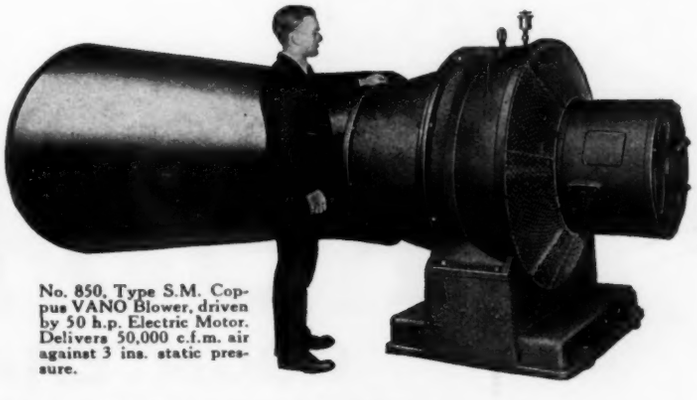
No. 500 Coppus VANO Blower Type S.T. Turbine Driven with Supporting Cradle.

For auxiliary drives, where electricity is not available nor desirable, the Coppus Steam Turbine is most satisfactory and efficient.

For Mechanical Stokers and Induced Draft, the Coppus Vano Blower is the most efficient made.

It combines the advantages of the centrifugal and propeller blower and is admirably adapted for either direct motor or turbine drive.

Made in all sizes and for all pressures.

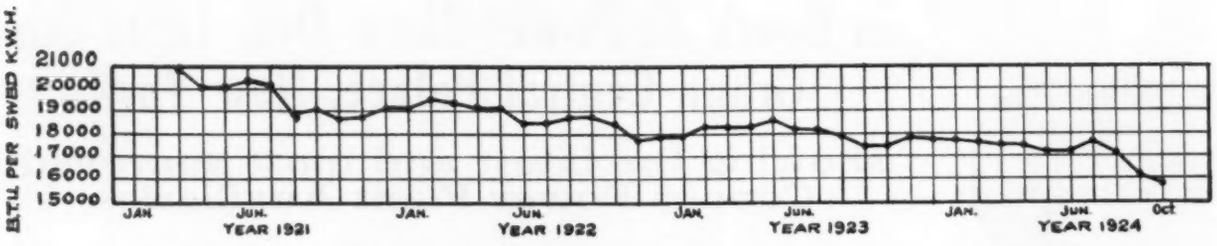


No. 850, Type S.M. Coppus VANO Blower, driven by 50 h.p. Electric Motor. Delivers 50,000 c.f.m. air against 3 ins. static pressure.

Obtain a full set of Coppus Bulletins—at our Booth or by mail. Ask us about your particular problem.

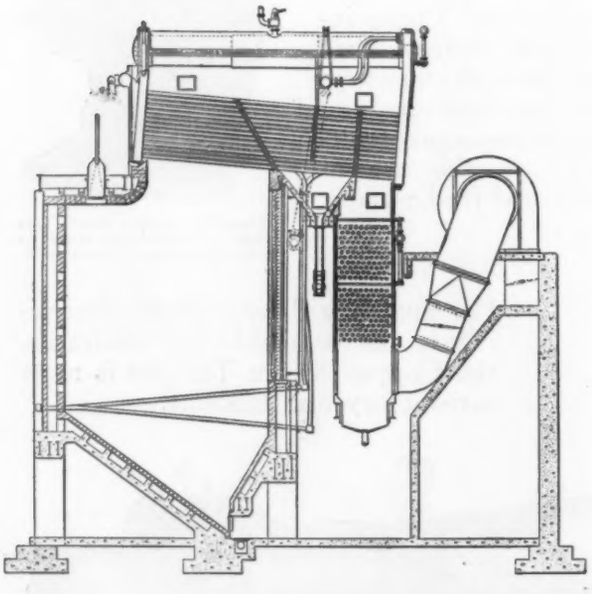
Coppus Engineering Corporation, 342-46 Park Ave., Worcester, Mass.

Lakeside's new



The above curve shows how the Lakeside efficiency has gradually improved throughout the four years of operation. The decided increase in efficiency, beginning August 1924, occurred when the new installation of Radiant Heat Superheaters and Foster Economizers was first put into operation.

Combined Foster Superheater-Economizer installation at the Lakeside Plant of the Milwaukee Electric Ry. & Lt. Co.



The results of the acceptance tests on the economizer show how Foster equipment is helping Lakeside—as well as thousands of other plants—to generate power economically.

In these tests, the Foster Economizers increased the feed water temperature more than 110°F., and reduced the flue gas temperature over 320,° representing a fuel saving of between 9 and 10 percent.

The Foster Radiant Heat Superheater, at Lakeside and in many other installations as well, has established itself as an unqualified success.

This unique type of superheater, the latest development of Foster pioneering, is installed as part of the furnace wall.

FOSTER
COUNTER-FLOW
ECONOMIZERS

record—

15795 B.t.u. per Kilowatt-hour

"For the month ending November 10, Mr. John Anderson, Chief Engineer of Power Plants of the Milwaukee Electric Railway & Light Co., reports:

I am very pleased indeed to report this month the following station statistics:

B.T.U. per switchboard kw. hr.—15795
Boiler efficiency during steaming—91.64%
Boiler Room efficiency plus banking—89.31%

It is equipped with the rosette type of soot blower, which provides for the absolute control of the amount of superheat, and by use of these soot blowers, constant superheat is obtained at all loads. Its location in the furnace setting protects the brickwork and reduces furnace maintenance.

The Lakeside record, and results in other plants amply prove the efficiency and durability of this type of equipment.

Note how the soot blowers have kept clean the surface of the Foster Radiant Heat Superheater.

POWER SPECIALTY CO.

Foster Superheaters and Economizers

111 Broadway, New York

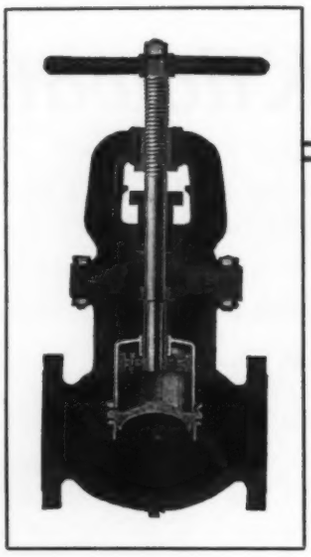
Boston Chicago Philadelphia San Francisco
Pittsburgh Detroit Kansas City Dallas
London, England

FOSTER

RADIANT HEAT

SUPERHEATERS

AT BOOTH No. 30-POWER SHOW - DEC. 1-6



An Assurance of

Power Plant Efficiency

EDWARD VALVES

EFFICIENCY, the keynote in modern generating station design, must be provided in valves to the same extent that it is found in turbines and other major apparatus. It is found in valves only when skill and knowledge are constantly directed toward the perfection of design and construction. The choice of Edward Valves for most of the large power plants operating at the higher pressures and temperatures is a worth-while indication of their ability not only to meet the efficiency demanded, but to set new standards.

See Our Data in 1924-25 A.S.M.E. Condensed Catalogues of Mechanical Equipment

THE EDWARD VALVE & MANUFACTURING CO.
EAST CHICAGO, INDIANA

SALES AGENCIES IN ALL PRINCIPAL CITIES

"If it concerns Ash, Remember"—

A·S·H

Booth 75

Power Show

Ash Gates—Ash Storage Bunkers—Standardized Sluicing Systems—"Catenary Curve" Cast Iron Coal Bunkers—Ash Quenchers—Air Cooled Bottoms for Powdered Fuel Furnaces—Sectional Cast Iron Ash Hoppers.

The ALLEN-SHERMAN-HOFF Co.

261 SOUTH 15th. STREET - PHILADELPHIA

Chicago Boston Detroit Pittsburgh St. Louis Atlanta Cincinnati
New York Rochester Kansas City, Mo. Wilkes-Barre, Pa. Indianapolis Minneapolis

Decided Savings in Operating Cost—

will follow the proper regulation of operating pressures

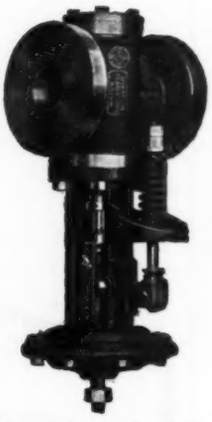
Economical Operating Pressures will be easily maintained after your plant is equipped with

MASON REGULATORS

Our experience gained during the forty years devoted to the development and manufacture of automatic pressure regulators is at your service.

Mason Standard Reducing Valves

Reduces and maintains even pressure of steam and air regardless of the variation of the initial pressure or of the volume of steam and air required. Sizes ½ in.-2 in. bronze body. Sizes 2½ in.-10 in. iron body, bronze mounted.



Mason Pump Regulator

For controlling the discharge pressure of steam-driven pumps—10 to 150 lb. pressure. Sizes ½ in.-1½ in. bronze body. Size 2 in.-4 in., iron body, bronze mounted.

There is always an efficient point at which reduced steam, air, water, oil and other service pressures should be carried. Any irregularity or deviation from this fixed pressure is waste.

Mason Boiler Feed Line Regulator

For controlling steam-driven boiler feed pumps. Size ½ in.-1½ in. bronze body. Size 2 in.-4 in. iron body, bronze mounted.

Mason Hydraulic Damper Regulator

Assures accurate regulations of boiler pressure—Double Acting—positive movement and actuated by water pressure in both directions. Equipped with 2¼ in., 3 in., 4 in. and 5 in. diameter operating cylinder.

The economy and efficiency of your plant demands unfailing reliability in pressure control. Only by automatic and scientific regulation can this absolute control be assured. Uncertainty is eliminated.

Visit our booth at the Power Show. See our regulators — talk with our engineers about them and your problems

Dealers in all principal cities carry Mason Regulating Devices in stock. The full line is described in our 200-page catalog, a copy of which will be mailed on request.

Buy through your dealer.
Write to us for technical catalog.

MASON REGULATOR CO.

Adams & Medway Sts., Boston, Mass.

How a California plant has eliminated boiler cleaning

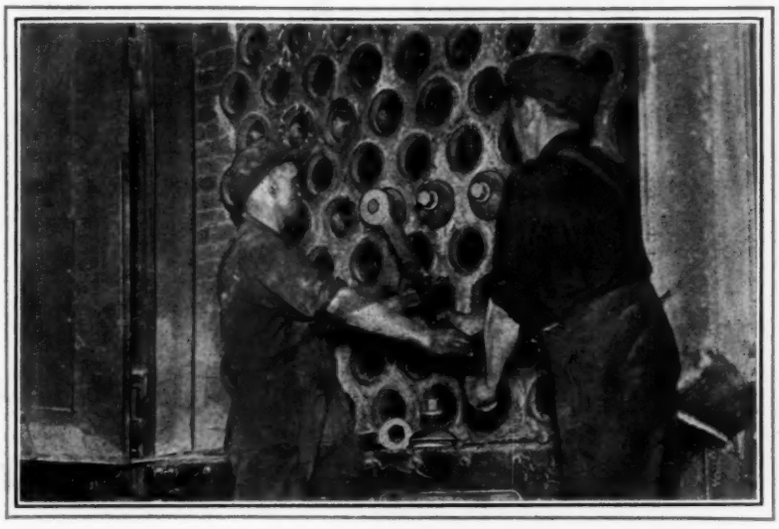
THE chief engineer of a certain Los Angeles manufacturing plant was troubled for many years by boiler scale. He had a hard problem to contend with because his water supply came from a deep well and contained a lot of scale-forming minerals. In addition his 350 H.P. Hawkes boiler was operated at high rating on shavings for fuel, and the hot spotty fire was continually burning out boiler tubes.

Scale formed so rapidly in the tubes that it deposited ⅛ inch thick in two weeks' time, causing frequent turbining, which had to be done on Sundays. Boiler compounds of various kinds were unable to overcome the difficulty.

Realizing that boiler repair and maintenance was costing entirely too much and that the water supply was at the base of the trouble, the chief engineer got in touch with The Permutit Company, water conditioning specialists.

The water was analyzed, operating conditions carefully studied and upon their recommendation two Permutit Water Softeners were installed. These were four feet six inches in diameter and delivered 16,800 gallons of absolutely soft water in 24 hours. That was in February, 1923. On August 22, 1924, the company wrote us as follows:

"We were having a great deal of trouble from boiler scale, and found it necessary to wash the boiler once a week, with loss of time due to tube replacements and such. Since installing Permutit Equipment we have had no scale, and much more soft water than we were promised. The replacement of tubes and other boiler repairs has been steadily decreased, while the operation of the boiler and plant has been 100% more efficient. Permutit has solved our boiler scale problem, and we are glad to recommend it to those who are having this trouble."



Is this a familiar scene in your plant? It should not be. With proper equipment you need not open your boilers from one year's end to another—except for inspection.

IF you are troubled with boiler scale, if you want to put an end forever to boiler cleaning, tube replacements and repairs, read this page.

The story told in this letter is a common one. It has been repeated in hundreds of plants all over the country, from big central power stations to little 50 H.P. heating boilers. No matter whether you operate a large plant or a very small one, there is a type of Permutit Softener that will solve your problem.

It will pay you to know more about this subject of water supply—to learn what the experience of other chief engineers has been. Our booklet, "Reducing Fuel and Boiler Plant Operating Costs" covers the subject fully. It is authoritative and answers many of the day-to-day problems you meet in your work. Return the coupon below for a free copy today. There is no obligation.

The Permutit Company
440 Fourth Ave. New York

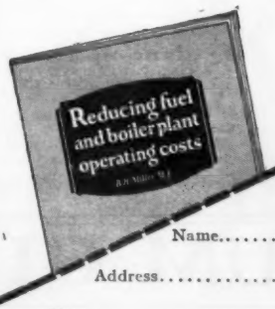
See our exhibit at the Power Show, Grand Central Palace, New York, December 1st to 6th, 1924. Booth No. 3.

THE Permutit Company are the largest specialists in water conditioning, the only firm that makes all types of water treating equipment, including both rapid and slow regenerating softeners.

Zeolite water softeners were introduced and developed in the United States by The Permutit Company, and today their installations cover every state in the Union, and every county in many states.

A special research laboratory and staff are maintained for solving the technical problems that arise in connection with industrial water softening. No plant is so large or so small but that there is Permutit apparatus to fit its needs.

Send for a copy of this free booklet today



The Permutit Company
440 Fourth Ave., New York

Please send me your free booklet "Reducing Fuel and Boiler Plant Operating Costs"

Name.....

Address.....

City.....State.....

AT BOOTH No. 533-POWER SHOW - DEC. 1-6

Why lubrication is important to plant executives

600-W

Here is specific oil
for specific economies

Why is Gargoyle Cylinder Oil 600-W the most widely known steam cylinder lubricant?

Because through sheer merit of service over a period of 47 years, it has become the standard of comparison among steam cylinder oils. As a result, it is endorsed by users and engine builders everywhere. Today, there is more Gargoyle Cylinder Oil 600-W sold throughout the world than any other brand of cylinder oil on the market.

What qualities earned this reputation?

Its ability to (1) atomize readily over a wide range of steam pressures and temperatures; (2) readily adhere to wet surfaces; (3) prevent leakage of steam past piston and rod packing; (4) clean working parts when it is first introduced; (5) to lubricate without causing char and carbonization.

These qualities result from refining the highest quality crudes by the Vacuum process.

Do physical tests determine these qualities?

No. Specific gravity, cold test, flash point, viscosity, and other laboratory tests are not true indications of its lubricating value. The only real test of steam cylinder oil is whether or not it will give the desired results in actual service. Gargoyle Cylinder Oil 600-W so tested will always form a lubricating film between rubbing surfaces and prevent leakage of steam past valves, pistons and rod packings.

What are the dollars and cents benefits to an operator of steam engines using Gargoyle Cylinder Oil 600-W?

Insurance of uninterrupted operation; lower production costs resulting from a decrease in the amount of power required to operate; and lower cost of lubrication through the small rate of feed required. A typical example of the latter:

Careful comparative tests carried out on a horizontal slide valve engine, showed the following comparative results using different qualities of steam cylinder oils.

	Frictional Load	*Oil drops per minute*
No lubrication	22% of rated h.p.	0
Ordinary cylinder oil	18% " " "	10
Better grade cylinder oil	16% " " "	4
Gargoyle Cylinder Oil 600-W	11% " " "	2

The Vacuum Oil Company has other grades of Steam Cylinder Oils which provide for a wide range of operating conditions. However, before prescribing the correct oil for you to use, we always study the mechanical and operating conditions of your steam engines. Write to our nearest branch listed below.

Domestic Branches:

New York (*Main Office*)	Detroit	Peoria
Albany	Indianapolis	Philadelphia
Boston	Kansas City, Mo.	Pittsburgh
Buffalo	Milwaukee	Portland, Me.
Chicago	Minneapolis	Rochester
Dallas	New Haven	Springfield, Mass.
Des Moines	Oklahoma City	St. Louis

THE LUBRICATION AUDIT

Here is a condensed outline showing how the Company's knowledge and experience is brought to bear on individual plant problems:

INSPECTION: A thoroughly experienced Vacuum Oil Company representative coöperates with your plant engineer or superintendent in making a careful survey and record of your mechanical equipment and operating conditions.

RECOMMENDATIONS: We later specify, in a written report, the correct oil and correct application of the oil for the efficient and economical operation of each engine and machine.

This report is based on:

1 The inspection of the machines in your plant.

2 Your operating conditions.

3 Our 58 years of lubricating experience with all types of mechanical equipment under all kinds of operating conditions throughout the world.

4 Our outstanding experience in manufacturing oils for every lubricating need.

CHECKING: If, following our recommendations in this Audit, you install our oils, periodical calls will be made to see that the desired results are continued.

FOR THE ABOVE FREE SERVICE address our nearest branch office.

Lubricating Oils

A grade for each type of service

VACUUM OIL COMPANY

15,795 B. t. u. per Net K. W. Hour
—*Another Record for Lakeside!*

A new and interesting booklet describing Lakeside, the World's Most Efficient Steam Plant, will be distributed by this Company at the

POWER SHOW
Booths 288-289

Come in and get your copy—there's no obligation attached.

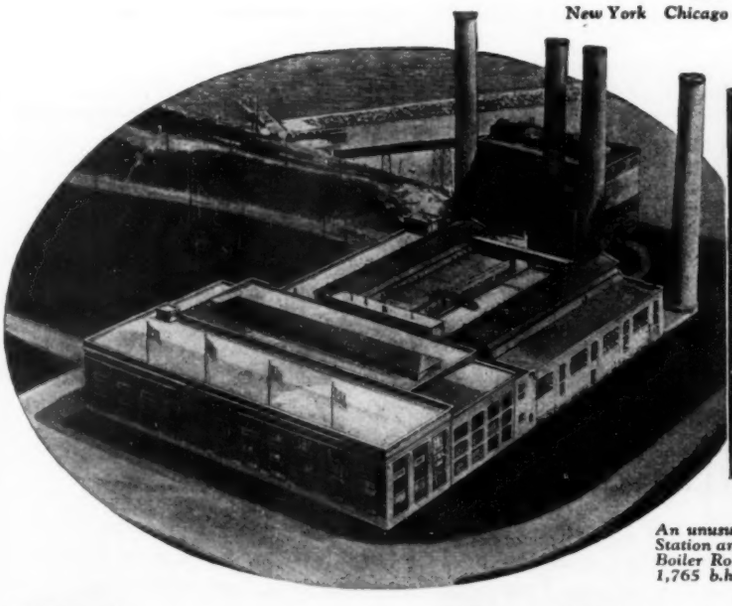
THE Lakeside Station of the Milwaukee Electric Railway & Light Company has again broken its own remarkable record of operating economy.

During October, fuel consumption amounted to just 15,795 B. t. u. per net kilowatt-hour produced.

The sixteen Edge Moor Boilers at Lakeside, totalling 24,568 b. h. p., have played an important part in establishing this station as the most efficient steam plant in the world—a position to which its operating records unquestionably entitle it.

Let us show you how Edge Moor Boilers can help to reduce *your* power costs.

EDGE MOOR IRON COMPANY
Established 1868
EDGE MOOR, DELAWARE
New York Chicago St. Paul Boston Pittsburgh Charlotte Los Angeles



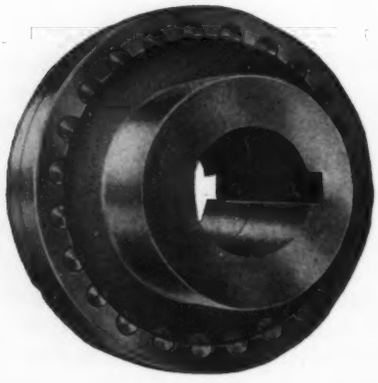
An unusual view of the Lakeside Station and—above—firing aisle in Boiler Room No. 2, showing four 1,765 b.h.p. Edge Moor Boilers.

EDGE MOOR Water Tube BOILERS

FOR INCREASED FUEL ECONOMY

AT BOOTH No. 85 - POWER SHOW - DEC. 1-6

Flexible couplings for every service



5 TYPES OF FRANCKE FLEXIBLE COUPLINGS
Pressed Steel Type—for Fractional H.P. drives
Heavy Pattern Type—a general purpose coupling
High Speed Type—for high speed drives
Double Type—for heavy duty, continuous drives
Marine Type—used on small power boats

FRANCKE FLEXIBLE COUPLINGS

"They make good machines last longer"

In all Francke designs laminated steel springs provide for shaft misalignments in every direction, cushion load shocks and vibrations, and where needed also act as a safety device.

Ask for Bulletin No. 37

SMITH & SERRELL
Coupling Specialists Since 1912.
28 Washington Place, Newark, N. J.
District Office, Fulton Building, Pittsburgh

AT BOOTH No. 336 - POWER SHOW - DEC. 1-6

SANDVIK BELT CONVEYORS IN A POWER PLANT

A Typical Example Of How They May Be Used To Advantage

Note the Simple Arrangement of a SANDVIK STEEL BELT CONVEYOR Distributing Coal Into Bunkers.

The Top Run Is Made Sliding On Wood Runners.

The Return Run is Supported by Idlers Spaced about 25′ 0″ apart.

A Simple Traveling Plow is used for Discharging Load Instead of the Cumbersome and Expensive Trippers Commonly Used with Fabric belts.

A Working Model 1/10 size Handling Coal Will Be On Exhibit at the Third National Exposition of Power and Mechanical Engineering, Booth 336.

Sandvik Belts are Economical to Install, Dependable and Give Long Uninterrupted Service.

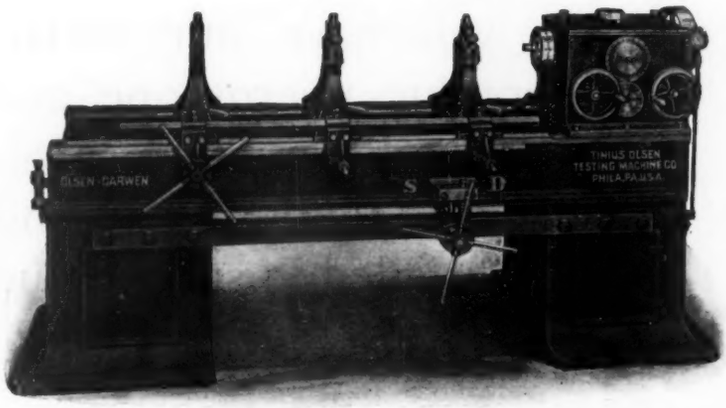
Sandvik

SANDVIK STEEL INC.
Woolworth Bldg.
233 Broadway
New York, N. Y.

STEEL BELT CONVEYOR

OLSEN TESTING MACHINES

OLSEN-CARWEN BALANCING MACHINES



Olsen-Carwen Static-Dynamic Balancing Machine No. 3-C

Pat'd. U. S. and Foreign Countries

Olsen-Carwen Static-Dynamic Balancing Machines indicate the amount of unbalance both statically and dynamically, in ounce inches on indicating dials; differentiating between the two, and also indicate the exact angle or plane of such unbalance. The point along the length of the rotor at which the static unbalance should be corrected is also indicated, thereby avoiding the introduction of a dynamic couple.

For accuracy plain bearings are used in mounting the parts to be balanced in the Balancing Machine and where the part to be balanced, as in the case of a crankshaft, is mounted in more than two bearings in the crank-case, it is mounted in three or more bearings in the Balancing Machine.

KNOWLEDGE IS POWER

Eliminate Vibration—Secure Perfect Balance with Speed and Economy

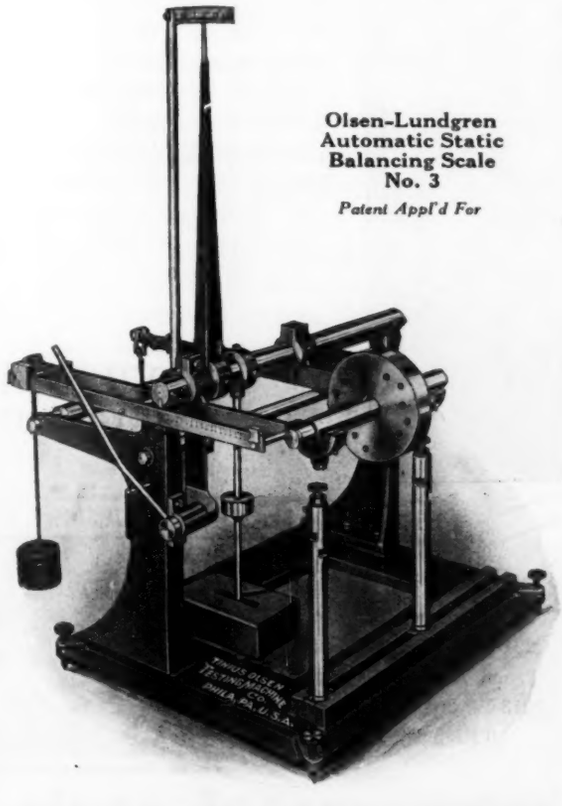
Where the static balance is sufficient, as for instance in a narrow rotor or where speed is not excessive, the Olsen-Lundgren Static Scale will indicate the amount of unbalance accurately in ounce inches and also locate the exact angle of unbalance. This scale is made in various sizes to balance all sizes and weights of parts, and thus eliminates the use of level ways.

All the latest up-to-date Olsen Testing Machines for determining the strength and quality of material.

The Herbert Pendulum Hardness Tester for determining by the time test the equivalent of the Brinell test, or by the scale test a "work hardness" or resistance to working with a tool, which is not measured by any other instrument.

Olsen-Lundgren Automatic Static Balancing Scale No. 3

Patent Appl'd For



Sole Manufacturers

TINIUS OLSEN TESTING MACHINE COMPANY

500 North Twelfth Street, Philadelphia, Pa., U. S. A.

Foreign Representatives:

Andrews & George Company, Tokyo, Japan
Edward G. Herbert, Ltd., Manchester, England
R. S. Stokvis & Fils, Paris, France

AT BOOTH No. 69 - POWER SHOW - DEC. 1-6

What happens when corrosion attacks condenser tubing?

Microstructure of a corroded condenser tube. Magnified 75x.

Engineers will be interested in seeing this sample board which shows the remarkable ductility of Scovill Cup Drawn Admiralty Condenser Tubing.

AT OUR BOOTH NO. 69 we will have our metallographic microscope and we will show actual specimens of condenser tubing which failed in service due to:

splitting or season cracking
incorrect composition
internal flaws (gas pockets)
incorrect structure.

We will also show the microstructures of Scovill Cup Drawn Admiralty and Scovill Special Muntz Condenser Tubing.

Engineers should take this opportunity to study the microstructure of condenser tubing at first hand.

SCOVILL MANUFACTURING COMPANY
MAIN OFFICE, MILLS, and FACTORIES—WATERBURY, CONN.

BRASS MILL PRODUCTS—MANUFACTURED GOODS TO ORDER

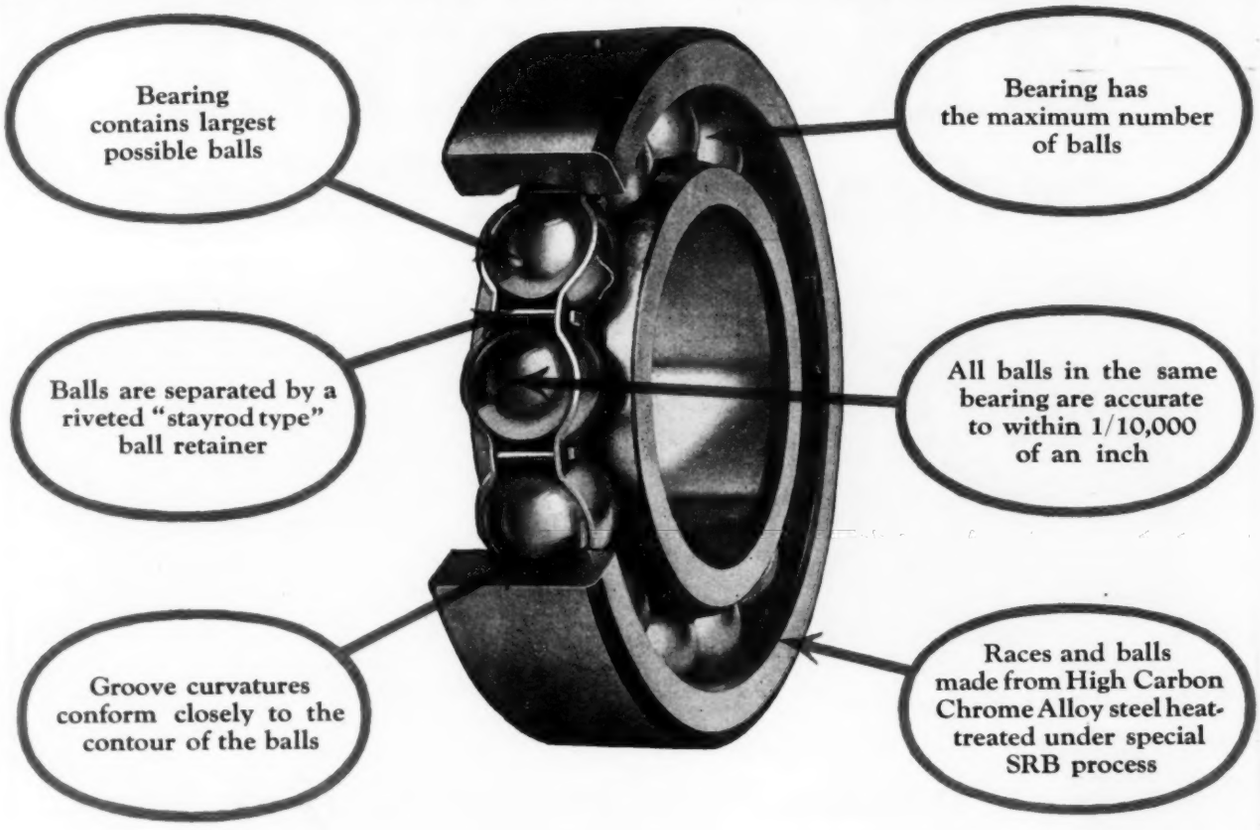
280 Broadway, New York
224 W. Lake St., Chicago
Penna. Bldg., Philadelphia
1213 W. 3rd St., Cleveland
10 High St., Boston

ESTABLISHED 1802
SCOVILL
MANUFACTURING COMPANY

Pacific Coast Sales Agent:
ENGLE-REID CO.
149 California Street,
San Francisco
Terminal Sales Bldg.,
Los Angeles

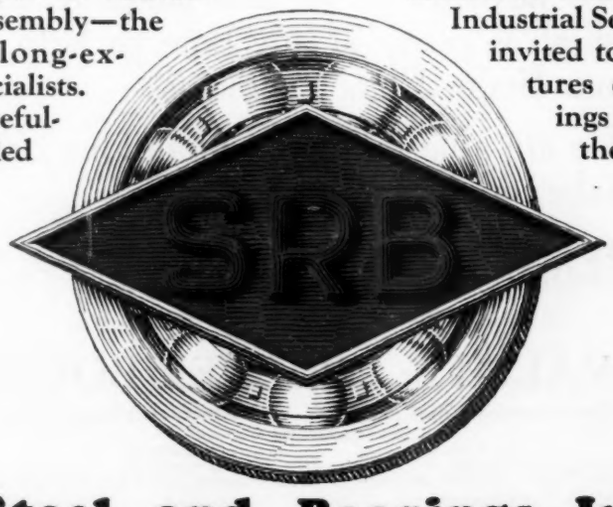
MEMBER COPPER and BRASS RESEARCH ASSOCIATION

SILENCE—THE SIGN OF PERFECTION



WHO does not have admiration for a piece of moving machinery that does its work smoothly—quietly? It is not the noiseless performance alone that wins respect. It is a recognition of what has gone before to make this quietness possible—perfect workmanship every step of the way, perfect relation of one moving part to another and perfect assembly—the product of long-experienced specialists.

All this carefulness is embodied in the production of SRB Bearings. Bars of High Carbon Chromium Steel are chemically analyzed and tested. Balls are forged by SRB experts—grinding is carefully and accurately done. Finally, all parts are assembled with watch-like precision to form a perfect unit. Only this is responsible for the exceptional silence of SRB Bearings for Industrial Service. You are invited to see these features of SRB Bearings in our booth at the Power Show.

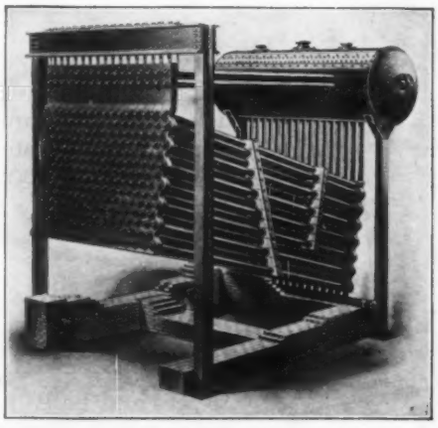


Standard Steel and Bearings Incorporated

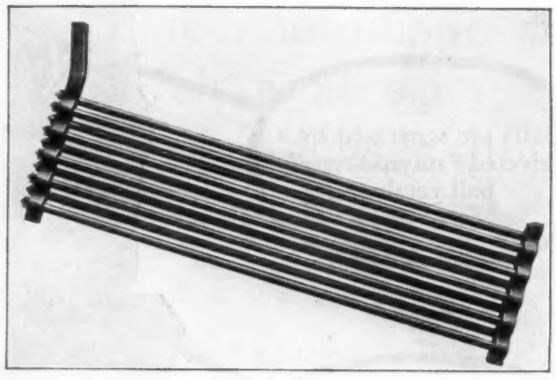
Plainville, Connecticut

Be Sure and See Our New

FORGED STEEL
Sectional Header Boilers



Forged Steel Sectional Header Boiler



Single Section of a Walsh & Weidner Sectional Header Boiler

Seamless Forged Steel Sectional Header

A seamless Forged Steel Sectional Header Boiler to meet the present day demand for High Pressures and Large Units.

Made in Units up to 25,000 square feet of Heating Surface and up to 500 pounds Working Pressure.

No Staybolts.

No Rivets in the Headers.

We have an up-to-date Engineering Department which is ready at any time to help you work out your Boiler Plant Problems.

We are able to make Quotations Promptly and to make quick Shipments.

REMEMBER These are ***Seamless Forged Steel Headers*** and not Cast Steel or So-Called Flowed Steel.

THE WALSH & WEIDNER BOILER CO.

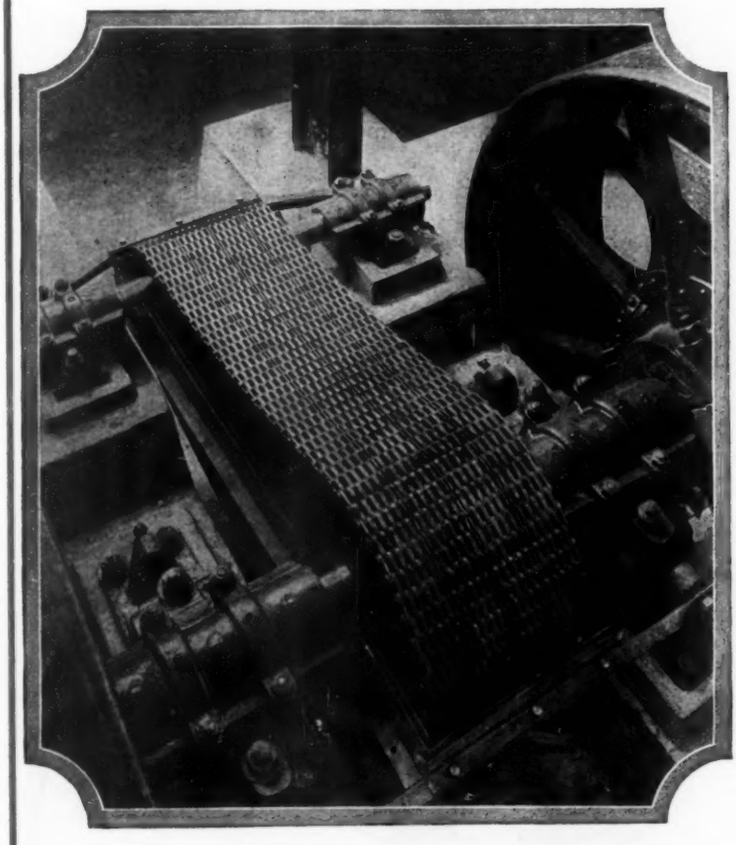
General Office and Works: Chattanooga, Tenn., U. S. A. Eastern and Export Office: 11 Broadway, New York

BRANCHES

New Orleans Havana San Francisco Memphis Greenville, S. C. Kansas City Jacksonville Chicago

Honolulu Agency—W. A. Ramsay, Ltd.

"WHITNEY"
SILENT CHAIN DRIVES



THIS **"WHITNEY SILENT CHAIN DRIVE"** is operated on 30″ centers, saves valuable space, and transmits over 98% of the developed power. No slippage is possible in the positive performance, throughout the long life of this efficient drive.

"WHITNEY" Silent Chain 75 H.P. Drive recently installed in the automobile plant of the Doble Steam Motors Co. This drive operates a dynamometer and the power is derived from placing the rear wheels of the Doble Car on the two 8 ft. pulleys shown on each side.

See our exhibit in the
Third National Exposition of Power and Mechanical Engineering
Grand Central Palace, New York, December 1 to 6, 1924

THE WHITNEY MFG. CO., Hartford, Conn.

SALES AND ENGINEERING OFFICES

NEW YORK
L. C. Biglow & Co., Inc.
243 W. 55th St.

BOSTON
George C. Steil
727-A Boylston St.

SYRACUSE
George McPherson
201 Norwood Ave.

PHILADELPHIA
R. J. Howison
624 Race St.

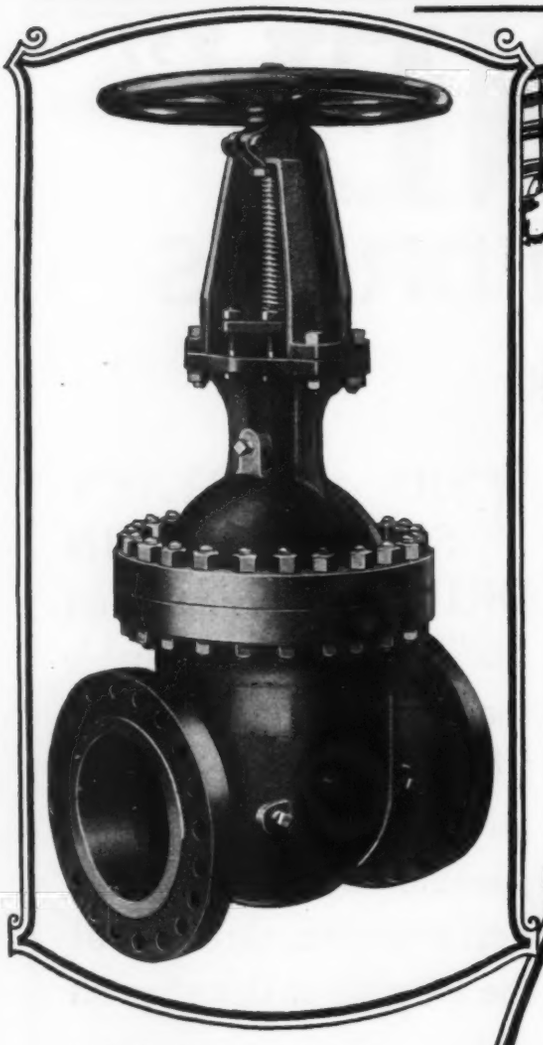
PITTSBURGH
Pittsburgh Gear & Mach. Co.
27th & Smallman Sts.

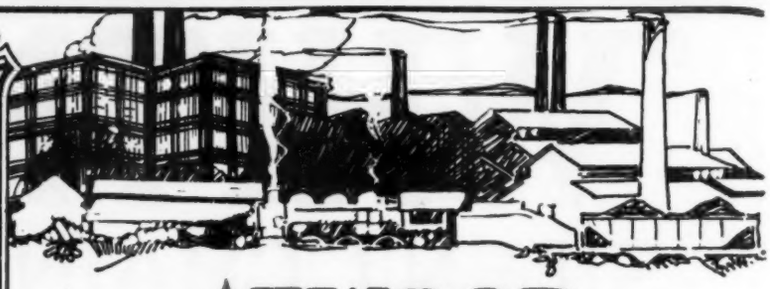
SAN FRANCISCO
A. H. Coates Co.
615 Howard St.

SEATTLE
A. H. Coates Co.
1115 East Union St.

CHAINS AND SPROCKETS FOR POWER TRANSMISSION

AT BOOTH No. 4-POWER SHOW - DEC. 1-6





ATWOOD
Steam Gate Valves

Designed for 400 and 600 pounds steam pressure and a total temperature of 750 degrees Fahrenheit.

The disc in these valves is so designed that unavoidable distortions, due to temperature changes and line strains, will be properly compensated for. Ball and socket joints are used in the discs and the disc mounting is attached to the disc by means of a dove tail joint.

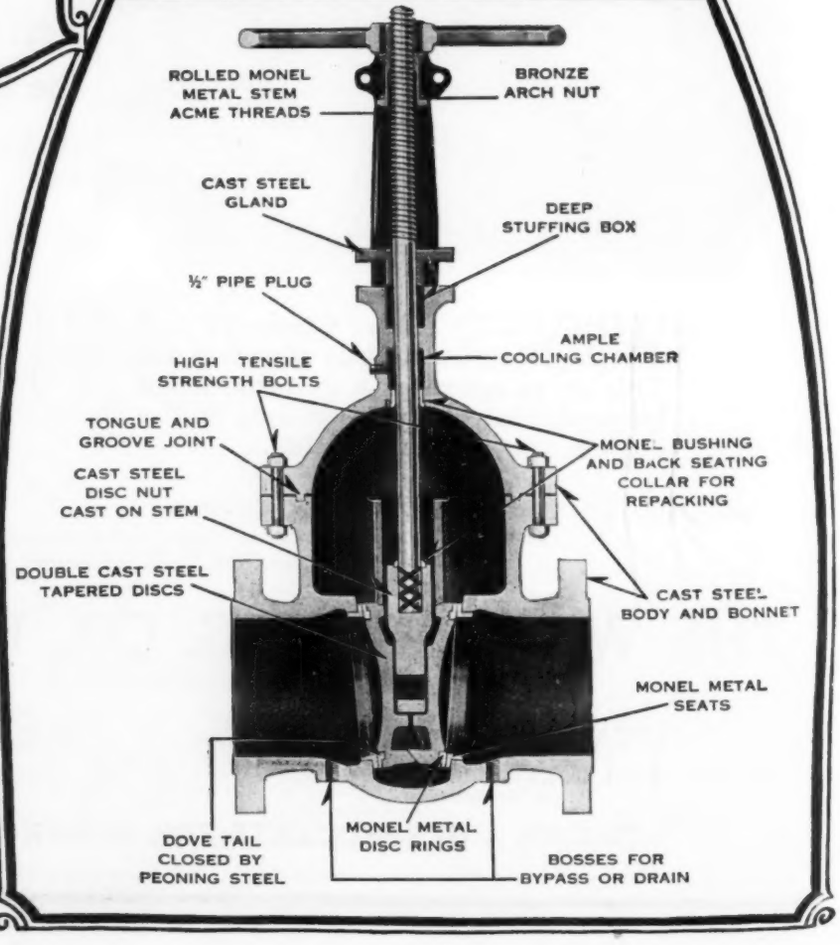
The joint between the stem and disc nut is made by casting the steel around the Monel stem,—an exclusive feature of the Atwood design.

A new descriptive bulletin we are distributing gives complete facts. Write today for your copy.

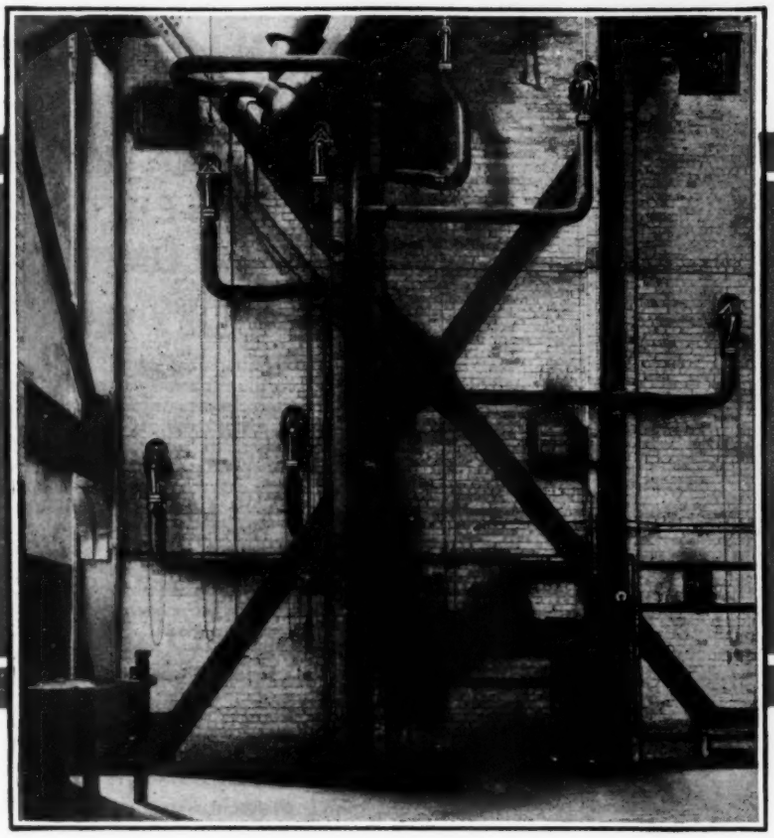
See Our Data in 1924-25 A.S.M.E. Condensed Catalogues of Mechanical Equipment

at the New York Power Show Dec. 1-6 this Company will exhibit at Booth No 4. Drop in any time.

ATWOOD

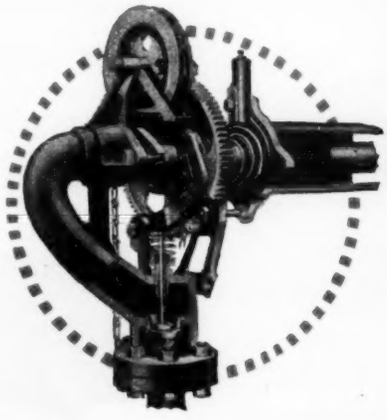


Pittsburgh Valve, Foundry and Construction Co.
26th Street
Pittsburgh, Penna.



At the NEW YORK POWER SHOW~
Operate Diamond "Valv-in-Head" Soot Blowers Yourself

In our booth you will find the "Valv-in-Head" soot blower mounted with wall box to imitation boiler wall. A calorized Diamond soot blower element is coupled to the soot blower head.



Operate this automatic valved soot blower yourself. Note the ease of operation and the proper speed of rotation. See how the special floating mechanism on the wall box permits motion in any direction and prevents binding of the head. Watch the trigger close and open the valve as you rotate the gears. By variation in this trigger it is possible to secure very quick opening of the valve or very slow opening.

Our representatives will demonstrate how, by proper arrangement of the cam, control of steam jets from the rotating element is assured.

These are only a few of the interesting features of this equipment. Your personal inspection will reveal the others.

And finally you will like to examine the actual service records showing the many economies effected by Diamond "Valv-in-Head" soot blowers. They are the best paying investment in the Power Plant. Ask for Bulletin 235, etc.

BOOTH 17

DIAMOND POWER SPECIALTY CORPORATION
DETROIT, MICH.

AT BOOTH No. 76 - POWER SHOW - DEC. 1-6

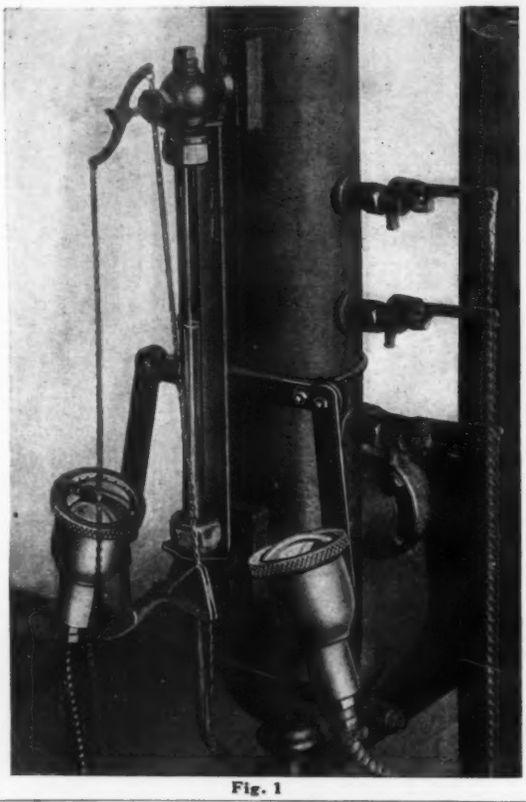


Fig. 1

NATIONAL COMPANY, INC.

CAMBRIDGE, MASSACHUSETTS

NATIONAL WATER COLUMN ILLUMINATOR

PATENTED

The National Water Column Illuminator has been designed to secure effective illumination of the boiler water column and other water level gauges, especially in Central Stations and power plants. It consists of a rugged casting containing the incandescent lamp and socket, a reflector and lens. Two of these illuminators are mounted on either side of the glass columns so as to concentrate the light upon the actual water level or meniscus which due to the total reflection of the light beam is thus made very conspicuous and easily visible even when the water gauge may be at a level some 40ft. above the boiler room floor. See Fig. 1. Means are provided for blowing compressed air over the lens to clean off accumulated dust. Illumination from below prevents annoying reflections from the glass. It will withstand the disruptive force of an exploding glass. Its installation is very reasonable. Is in daily use in some of the country's largest plants.

TERRITORIAL REPRESENTATIVES

George W. Stetson,	141 Milk Street, Boston.
W. K. Sowdon,	280 Madison Ave., New York City.
Sherman Engineering Co.,	254 S. 15th St., Phila, Pa.
H. W. Jarrett,	Rockfeller Bldg., Cleveland, Ohio.
Waterworks Supply Co.,	Call Bldg., San Francisco, Cal.
Richard-Nickling Co.,	4612 Woodward Ave., Detroit, Mich.

Bulletin Number 102 Sent on Request

AT BOOTH Nos. 217-218-POWER SHOW-DEC. 1-6

(56) *Water Tube Boilers, Horizontal Tubular Boilers* PART 1 A.S.M.E. CATALOGUE

ERIE CITY IRON WORKS

ERIE, PENNSYLVANIA

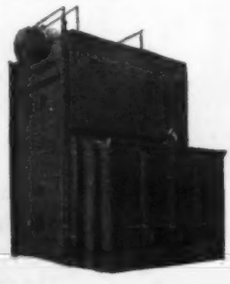
Manufacturer of Vertical Water Tube Boilers, Horizontal Water Tube Boilers, Return Tubular Boilers, "Economic" Portable Boilers, Shaking Grates, Powdered Coal Apparatus

HORIZONTAL WATER TUBE BOILER:

Erie City Boilers maintain a high efficiency due to their free circulation, ample steam liberating surface, large steam-holding capacity, correct baffling and the correct ratio of grate to heating surface. The tubes are of the most efficient diameter and length. All openings and outlets are conveniently placed and of the proper design. Minimum head room required.

The material is selected with utmost care, formed and cut with modern tools and fabricated by skilled mechanics who have had years of training in correct boiler building.

Provided with regular grates, shaking grates, mechanical stokers, gas or oil burners, or powdered coal apparatus. The furnace can be designed for wood, refuse, bagasse or similar fuels.



These boilers are regularly stocked in 7 sizes: 150, 200, 250, 300, 350, 400 and 500 horse power, with working pressures of 160, 180 and 200 lbs. Larger or higher pressure boilers built to order.

Furnished with or without superheaters.

VERTICAL WATER TUBE BOILER:

Liberates dry steam at a lower cost than any other known type of boiler.

The tubes, being upright, are completely surrounded by the moving gases, resulting in maximum heat absorption, as well as very rapid circulation.

There are no handholes or other unnecessary and trouble-causing joints.

The entire weight of the boiler is supported by a self-contained steel structure. The boiler, suspended by the upper drum resting on saddles secured to the steel structure, is free to expand or contract without restriction.

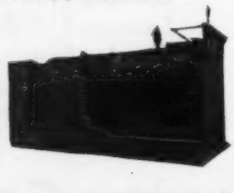
Supplied with or without a superheater. Provision can be made for firing with various grades and kinds of fuel. Any type of grate, mechanical stoker or powdered coal apparatus may be applied.

These boilers are carried in stock at our works in units up to 800 horse power. Larger sizes built to order.

If you have an unusual condition to meet—as an uncommon steam temperature, space limitation or fuel selection, let our engineering department aid you in its solution.

HORIZONTAL TUBULAR STATIONARY BOILER:

The design is the product of many years of experience and is in keeping with the best boiler practice.



ERIE CITY IRON WORKS **ERIE, PA.**

Butt joints, with inner and outer straps, are standard for longitudinal seams. Our plates are rolled the correct thickness throughout, checked by micrometer measurement. Ample bracing is used throughout. All openings and outlets are carefully designed for accessibility and safety.

The workmanship is kept at a high standard. All rivet holes are punched on a multiple punching table for accuracy, reamed, and every rivet driven by machinery. Caulking is done with pneumatically driven round-nosed tools. Tubes are set in reamed and chamfered holes and carefully beaded with a roller expander.

Erie City Boilers are designed with a minimum factor of safety of five. Each boiler is carefully tested.

The stock sizes range from 20 to 200 horse power for 100 lbs., 125 or 150 lbs. working pressure.

Catalogues describing our boilers will be sent on request.

ERIE CITY ECONOMIC BOILER:

Careful and thorough construction, mobility, economy, safety and durability are the characteristics that have made this boiler a criterion of its type.

There are no stay-bolted water sides to fill with sediment and burn out or flat crown sheets to be exposed by low water and thereby cause an explosion.

The materials are of the same high quality as our stationary types and conform to the requirements of the A. S. M. E. Boiler Code. The furnace is fire brick lined with suitable air spaces to prevent warped plates.

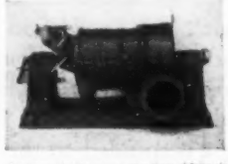
These boilers can be furnished complete, including Stack, in sizes from 20 to 150 horse power for 100, 125 and 150 lbs. working pressure.

A certificate of inspection can be had by purchaser on request.

PULVERIZED COAL APPARATUS:

We are now manufacturing a perfected, self-contained unit Pulverized Coal Burner, known as the Seymour Pulverizer and Furnace.

The pulverizer unit consists of a magnetic separator, pulverizer and drive, blower and necessary piping. The furnace is of special design to protect the furnace lining and to utilize much of the heat otherwise lost by radiation.



Broadly its advantages over other types of firing are, utilization of all grades of coal, constant and maximum efficiency at all rates of firing, perfectly flexible to meet load demand changes, accurate control of air to fuel ratio.

Send for Pulverized Coal Apparatus Bulletin.

LENTZ POPPET VALVE ENGINE:

This engine is the result of years of experimentation and practical service and its success has proved gratifying to us.

Its frictionless poppet valves remain tight throughout the life of the engine. It is designed so that vibrations is at a minimum. Can be operated condensing or non-condensing using saturated or superheated steam, without any structural complications.

Our most convincing argument for its purchase is that you ask the man who owns one what he thinks of it.

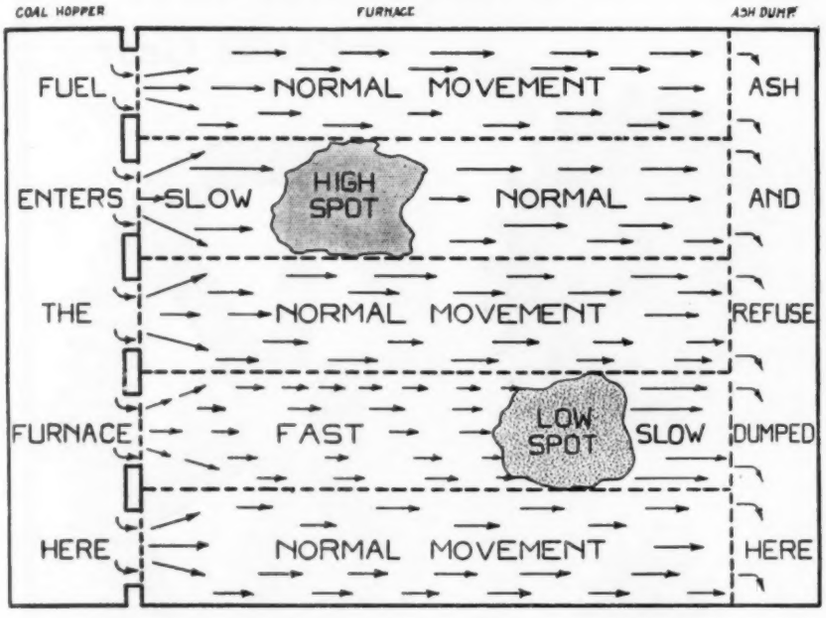
Bulletins and detailed information sent upon request.

See also our Current Advertisement in MECHANICAL ENGINEERING

When looking through your copy of the newly issued 1924-25 volume of A.S.M.E. CONDENSED CATALOGUES, you will find interesting data on our two pages Nos. 54 & 55

ERIE CITY IRON WORKS **ERIE, PENNSYLVANIA**

In operation —at the N. Y. Power Show

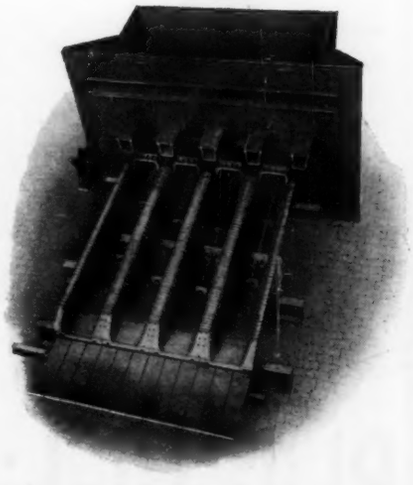


FUEL BED DIAGRAM-5-RETORT DETROIT UNDERFEED STOKER

See full size stokers demonstrate unequalled control of the fuel bed

If you'll study the diagram above you will get a first rate idea of one of the outstanding reasons back of the steadily mounting popularity of Detroit Multiple Retort Stokers. The fuel bed is LEVEL. Gravity being eliminated, there is NO AVALANCHING. From coal hopper, to ash dump, every movement of the fuel bed is mechanical and UNDER CONTROL. Independent adjustments of stoker ram and separate adjustment of stroke of pusher rod, give complete control of fuel movement on EACH RETORT.

Should a high spot develop in the fuel bed, the flow of coal *to* the high spot may be *retarded*. Should a low spot develop the feed of the fuel may be immediately increased while the movement of fuel away from the low spot is retarded.



Detroit Underfeed Stokers possess many exclusive features—features which win the high regard of every operating man. There is a Detroit Stoker for every service.

Ask for Bulletin 128

DETROIT STOKER COMPANY

128 General Motors Building

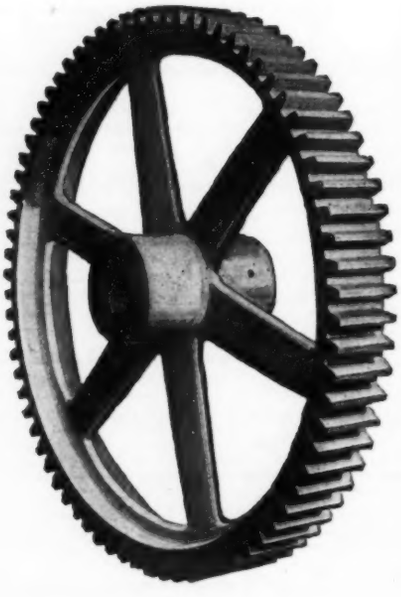
DETROIT MICHIGAN

DETROIT UNDERFEED STOKERS

AT BOOTH No. 10-POWER SHOW - DEC. 1-6

"To make a gear which is right in every respect is an art. We have that art."

—Phillie Gear



MEMBER OF AGMA

"A Badge of Merit"

HERRINGBONE, SPUR and WORM GEARS
up to 160″ in diameter

BEVEL and INTERNAL GEARS
up to 80″ in diameter

MICARTA and RAW-HIDE GEARS
up to 12″ in diameter in 24 hours

Speed Reducing units of every combination up to 200 H. P., any ratio. Our new right angle unit of spiral bevel gears and herringbone gears requires *no cooling device* at high speed!

We will send you our catalog, a very interesting book, full of information. send us your address.

Philadelphia GEAR Works

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BORSIG VALVE

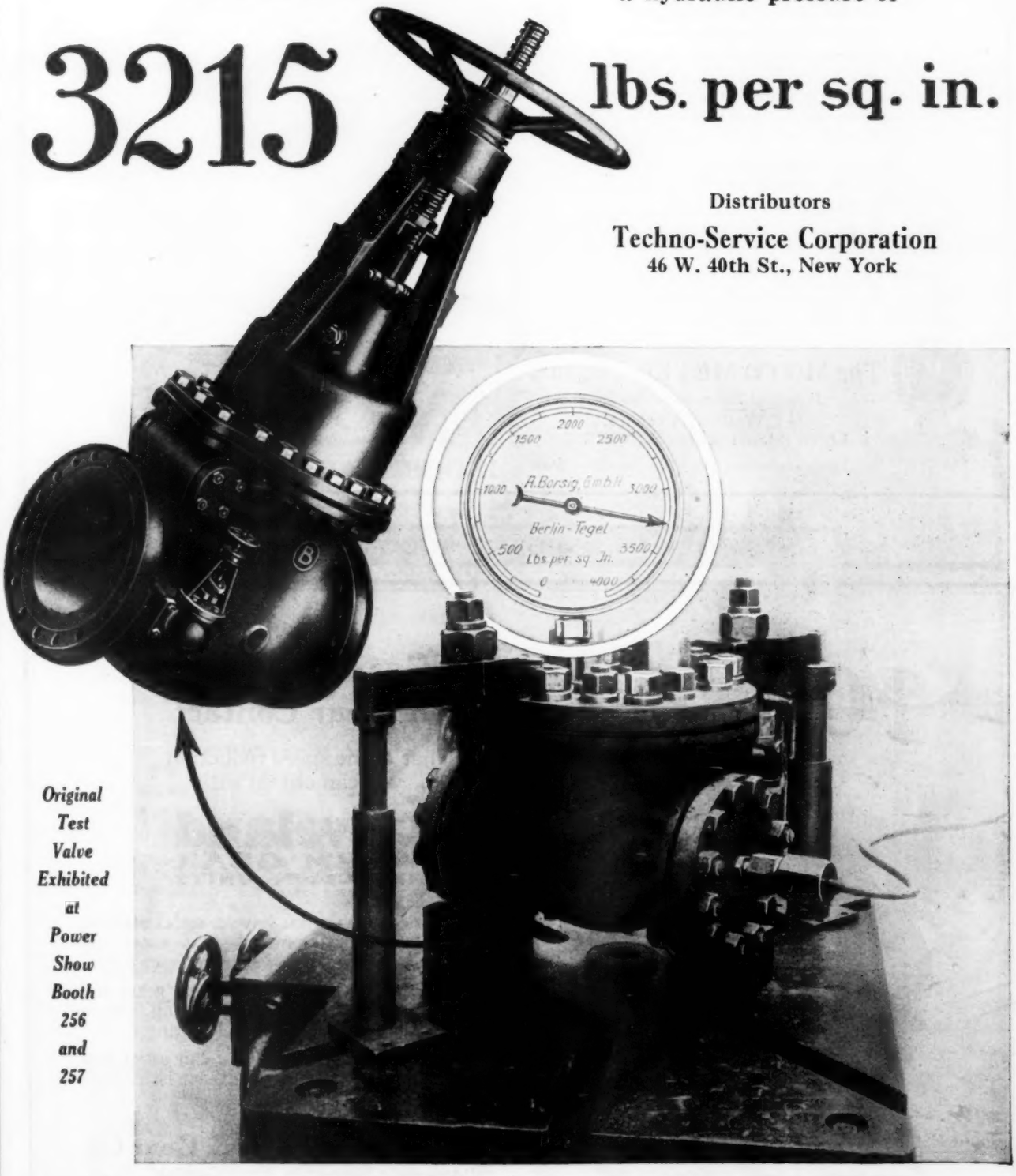
for 300 lbs. working pressure
750°F temperature

Withstood
a hydraulic pressure of

3215 lbs. per sq. in.

Distributors

Techno-Service Corporation
46 W. 40th St., New York



Original Test Valve Exhibited at Power Show Booth 256 and 257

Your Power Plant is no better than its Valves

AT BOOTH No. 254 - POWER SHOW - DEC. 1-6

As Easy to Read as a Clock

One glance at a Motoco thermometer and you know the *exact* temperature. The red pointer stands out in strong contrast against the bold, black figures on the white dial.

No danger of errors in reading. No risk of damaged goods or processes gone wrong.

Even when you wish to know the temperature at a dark or inaccessible point, the Motoco can be easily read because the dial can be mounted in the light as far as 50 ft. from the sensitive bulb at the other end of the capillary tubing.

The Motoco is guaranteed to be unfailingly accurate and embodies many features found in no other thermometer.

Yet it costs about the same as hard-to-read glass-tube thermometers of the better grade.

Furnished with tubing or rigid stem for temperatures between minus 40° and plus 750° F.

Ask for our new catalog No. 11.

The MOTO METER CO., Inc.
Industrial Thermometer Division
11 Wilbur Avenue
LONG ISLAND CITY, NEW YORK
Made by the manufacturers of the famous Boyce Moto Meter

MOTOCO
INDUSTRIAL THERMOMETER

AT BOOTH No. 92 - POWER SHOW - DEC. 1 - 6

100 to 1

with only

2 Gears 4 Bearings
1 Gear Contact

That is the speed reduction you can obtain with

Cleveland
WORM GEAR
REDUCTION UNITS

Conveyor from Saw in Lumber Mill Motor 7½ H.P. at 1200 R.P.M. Speed Reduction 8¾ to 1

and in addition to this you have a self-contained, self-oiling unit—quiet—longer lasting—more efficient and having a mnch lower maintenance cost.

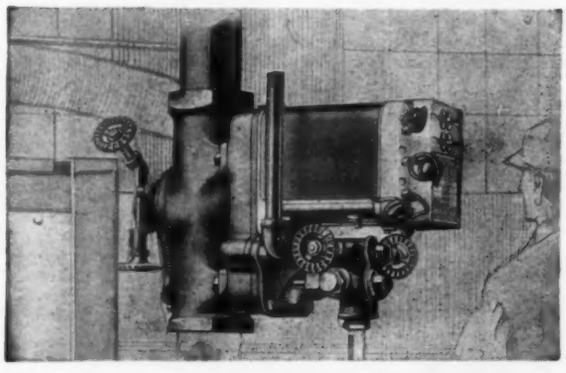
Compare this to the nest of whirling gears and bearings in spur gear reducers—a slipping belt—a stretching chain—or exposed bevel gearing.

Cleveland pioneering experience can assist you in your speed reduction problems—it is at your disposal—cheerfully.

The Cleveland Worm & Gear Co.
"America's Pioneers in Worm Gearing"
Payne Ave. and 40th St. Cleveland, O.

BRAINS *plus* Mechanical Equipment

In the Modern Scientific Control of HEAT TREATING PROCESSES



THE important process of heat treating requires certain technical knowledge, and men skilled in this line are valuable.

Installing reliable Automatic Temperature Control Equipment does not dispense with the man and his dependability, but it does relieve him of the tedious responsibilities required in controlling the furnace or oven temperatures.

BRISTOLS over a period of many years have *perfected* this Automatic Control to the point where it makes *all mechanical parts of the process* genuinely automatic. Results thus can be repeated time and time again. Your product is assured uniformity and quality. There is less spoiled material. Fuel costs are reduced.

You will be interested in closer acquaintance with the Bristol-Fuller MOTOR-OPERATED Controller Valve—the latest and termed by industrial experts the most remarkable development in Automatic Controls for Oil and Air, Oil and Steam, Gas and Air, Gas, Steam, Air. *May we send you descriptive literature?*

The Bristol Co., Waterbury, Conn.

BRANCH OFFICES:

Boston — New York — Pittsburgh — Detroit — Chicago — St. Louis — San Francisco

TRADE MARK

BRISTOL'S

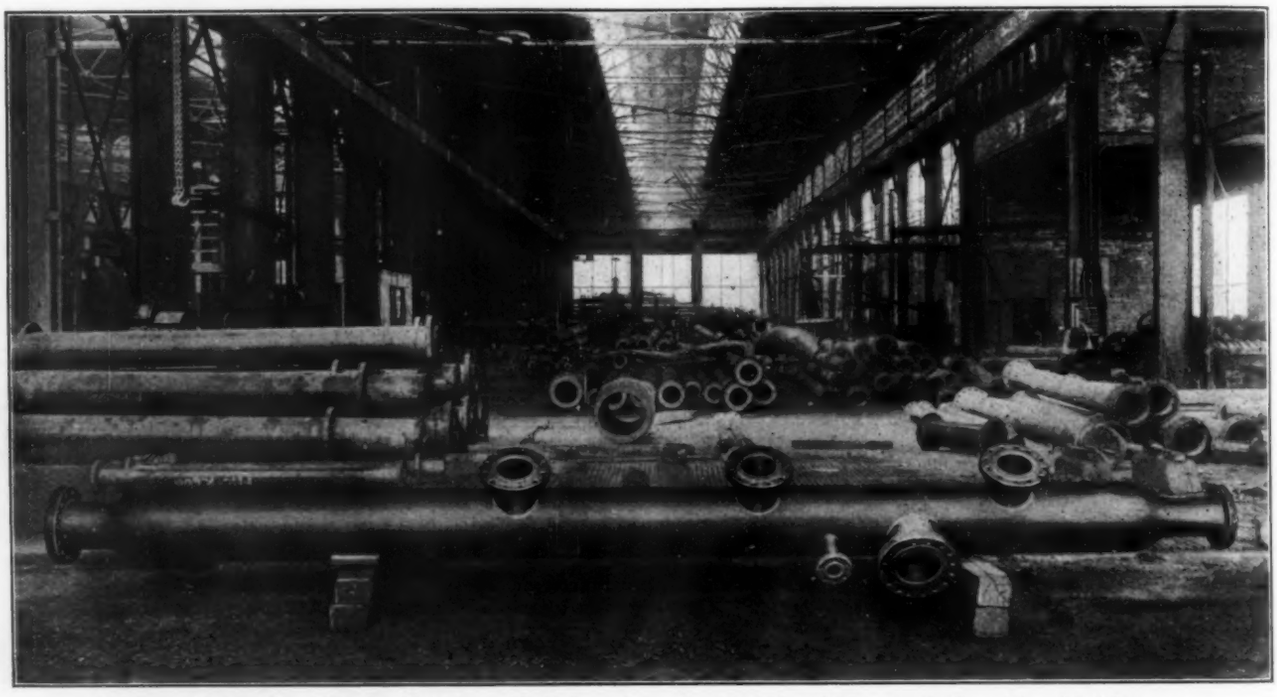
REG. U.S. PAT. OFFICE

RECORDING THERMOMETERS

AT BOOTH No. 72 - POWER SHOW - DEC. 1-6

KELLOGG

Forge Welded Steel Headers



16″ Forge Welded Steel Header 22′0″ long, 1″ thick; ends swedged to 10″ and 8″ respectively; with welded flanges; 3-8″ and 1-10″ special flued type nozzle; 3-3″ screwed and electric welded nozzles; 7″ O.D. drip pocket. Working steam pressure 275#; total temperature 600°F.; test pressure 1000#; for the Cumberland County Power & Light Co. Plant at Portland, Maine. Engineer: C. O. Lenz, New York City.

Our products include:

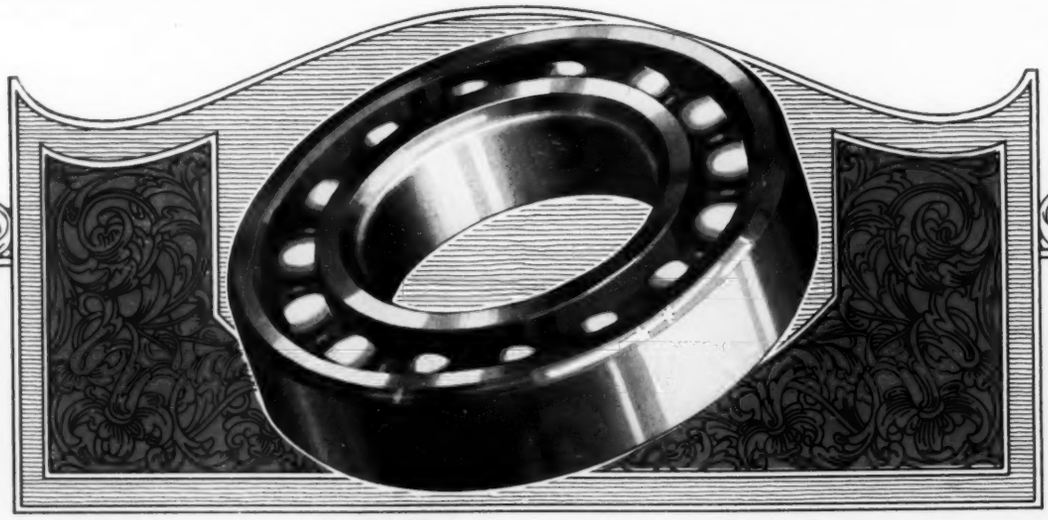
Forge Welded Headers
Forge Welded Receivers and Separators
100% Lap (Van Stone) Joints, plain or Sargol
Forge Welded Flanges, plain or tongue and groove
Pipe Bends, up to 120″

Cast Iron Flanged Fittings, up to 10 tons in one piece
Hammer Welded Pipe, 24″ to 132″
Hydro-Electric Penstocks
Slip Type Expansion Joints, plain or copper plated, up to 129″ diameter
Complete Power Plant Piping, Industrial Piping and Penstock Installations

All Kellogg Forge Welded Products are Insurable

M. W. KELLOGG COMPANY — 140 Cedar Street, New York, N. Y.

Main Office and Works: Jersey City, N. J.



New Departure Ball Bearings

The Wizardry of Steel Balls

YOU are cordially invited to witness the sensational antics of steel balls at our exhibit, Spaces 346 and 347 at the "Power Show", New York, December 1 to 6.

You will be interested to see how a factory test has been utilized to demonstrate the uniform quality and precision of the steel balls regularly used in New Departure ball bearings.

107

If you cannot attend the Power Show, write for your copy of the booklet which explains just how these balls act, why they do it, and what they prove—it will give you a new conception of the pains taken and ingenuity applied in the manufacture of New Departure steel balls.

The New Departure Manufacturing Company
Bristol, Conn.

Detroit Chicago

Ball Bearings Do Not Wear

At Your Service!

THE
A.S.M.E.
BOOTH
No. 80

Third National Exposition of Power and Mechanical Engineering

Grand Central Palace, New York, N. Y., December 1st to 6th

YOU are cordially invited to visit the A.S.M.E. Booth, Number 80, and make it your headquarters during the Power Show.

Mail addressed to the booth will be held until your arrival.

Appointments can be made to meet your friends at the booth.

Information can be had about the exposition; A.S.M.E. Annual Meeting which is being held at the same time; New York City, and vicinity.

Applications can be filed at the booth for membership in the Society.

Publications of the Society will be on exhibition.

American Society of Mechanical Engineers

29 West 39th Street, New York, N. Y.

Best Out of Three In Actual Service Competition

IN 1922 the H. F. Watson Co., manufacturers of roofing and insulating material at Erie, Pa., installed a 360 H. P. Connelly water tube boiler in the same power plant with boilers of two other makes and operated under identical conditions.

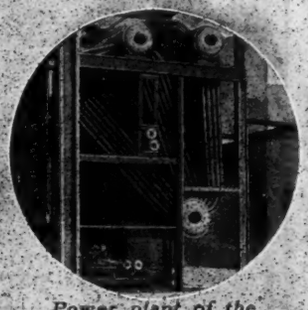
The performance of the Connelly was so gratifying to the men responsible for maintaining profits through the years to come that when additional capacity became necessary the following year, an order was immediately placed for *two 423 H. P. Connellys.*

Such repeat orders are the best evidence of what users think of any product. Connelly boilers have a unique record of repeating against competition and under all circumstances.

Generators of steam continue to buy Connelly boilers for both large and small requirements because of the economy of operation, quick steaming ability and dry steam furnished by the patented Connelly design.

Built in units of from 200 to 3000 H. P. and for steam pressures up to 400 lbs. Fully explanatory catalog gladly sent on request.

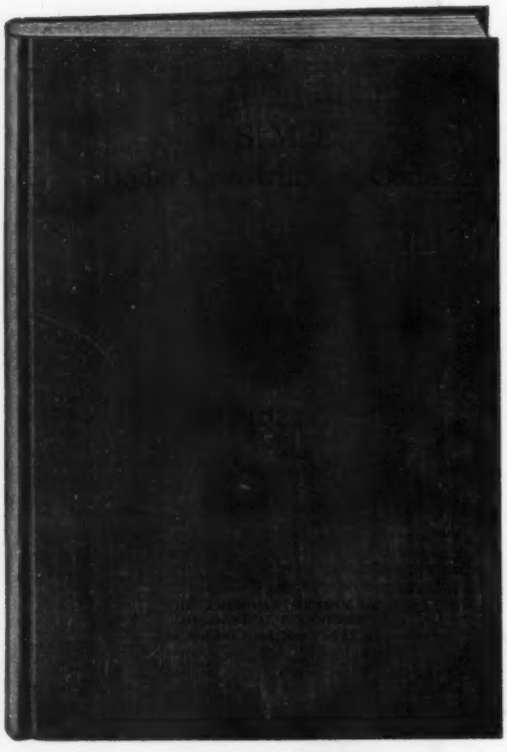
The CONNELLY BOILER COMPANY
1170 Ivanhoe Rd. Cleveland Ohio



Power plant of the H. F. Watson Co., Erie, Pa., operating one 360 H. P. and two 423 H. P. Connelly water tube boilers.

Available—

The 1924 Edition of the
A.S.M.E. BOILER CONSTRUCTION CODE



Gray Cloth Binding
208 Pages—Size 5½ x 7¾ inches

The Most Complete and Exact Manual of American Boiler Practice that has Ever Been Published

More than two hundred Interpretations formulated by the A.S.M.E. Boiler Code Committee during the past four years, have been incorporated and written into the 1924 Boiler Construction Code; certain of the rules have been explained and amplified; and whenever necessary charts, tables and diagrams have been used. In fact no detail has been overlooked which could make the new code complete and more clearly applicable to general boiler construction than any previous edition.

While the paging of the 1924 code has been altered to provide for the increased volume of rules and the page size has been reduced to 5½" x 7¾", the subjects and paragraphs in the Power Boiler Section of the code have been left unaltered in arrangement in order that reference to paragraphs may remain uniform, and therefore, of greater convenience to users.

A new and valuable section which has been added to the code is the rules for Inspection of Material and Steam Boilers. Four years of preliminary investigative and research work were required to formulate these rules.

Of particular interest to the boiler manufacturer is the revised and greatly enlarged Material Specification Section which has been amplified and brought up to date for all of the materials used in the construction of boilers and now constitutes Section 11 of the Code.

The new code consists of:

Section I Construction Rules for Power Boilers
Section II Material Specifications
Section VI Rules for Inspection
Appendix, embracing explanatory notes and recommendations relating to boiler construction.
Index — Complete and carefully arranged.

Price $2.50 (to A.S.M.E. Members $2.00)

STATES and CITIES
that have adopted
The A.S.M.E. Boiler Construction Code

STATES—

Arkansas
California
Delaware
Hawaiian Islands
Indiana
Maryland
Michigan
Minnesota
Missouri
New Jersey
New York
Ohio
Oklahoma
Oregon
Pennsylvania
Rhode Island
Utah
Washington
Wisconsin

CITIES—

Chicago, Ill.
Detroit, Mich.
Erie, Pa.
Kansas City, Mo.
Los Angeles Cal.
Memphis, Tenn.
Nashville, Tenn.
Omaha, Neb.
Parkersburg, W. Va.
Philadelphia, Pa.
St. Joseph, Mo.
Scranton, Pa.
St. Louis, Mo.
Tampa, Fla.
Seattle, Wash.

Interpretations of the Boiler Code

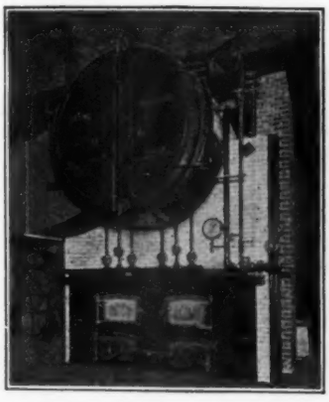
Second only to the Boiler Code in importance, are the Interpretations, formulated at the monthly meetings of the Boiler Code Committee and issued in data sheet form.

These Interpretations are prepared after the Committee's careful consideration of the numerous inquiries regarding the application of the code; problems not fully covered by the code and when there is any question of doubt on the part of the users of the code.

Knowing the value of the Interpretations to all those interested in the code, the Society has inaugurated the practice of supplying them on regular subscriptions, together with an attractive cloth binder which will hold both the Interpretations and the Boiler Code. Subscriptions including binder—$3.00 a year.

Publication Sales Department
The American Society of Mechanical Engineers
29 West 39th St., New York

WEBSTER Improved Return Tubular Boilers



Is it any wonder—

That **WEBSTER BOILERS** are making so many good friends when you consider their

High Efficiency and Low Fuel Costs

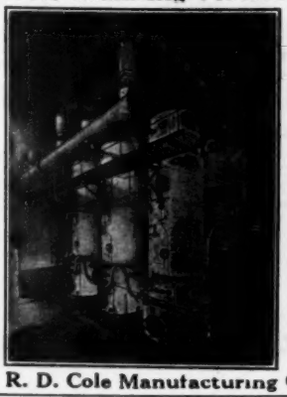
Each user of **WEBSTER BOILERS** is cutting his fuel bill at least 50%.

WEBSTER BOILERS will be your good friend, too, if you install them!

Write today for particulars. No obligation.

HOWARD J. WEBSTER, *Engineer.*
Harrison Building, Philadelphia, Pa.

Cole-Manning Vertical Fire-Tube Boilers



This type of boiler is constructed in units up to 400 horse-power and for pressure of 200 lbs. or more. Boiler shell is supported on a one-piece cast iron base which can be fitted with stationary or shaking grates. Smoke box is provided with removable cast iron cover and connections for all standard soot-cleaning devices. The evaporative performance, super-heating qualities and small floor space per horse power combine to make a most desirable and economical unit.

Further information regarding Cole Boilers, Tanks, Plate Work, etc., will be found on page 49 of the 1924-25 volume, A.S.M.E. Condensed Catalogues.

R. D. Cole Manufacturing Co. Newnan, Ga.

THE LADD WATER TUBE BOILER

See Our Exhibit in Booth No. 91
THIRD NATIONAL EXPOSITION OF POWER AND MECHANICAL ENGINEERING
Grand Central Palace, New York, N. Y.
December 1st to 6th, 1924

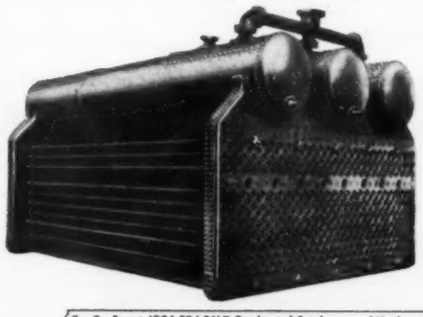
THE GEORGE T. LADD COMPANY
First National Bank Building
Pittsburgh, Penna.

Chicago Office: 528 McCormick Building
New York Office: 39 Cortlandt St.
Philadelphia Office: 502 Franklin Bank Bldg.

See Our Data in 1924-25 A.S.M.E. Condensed Catalogues of Mechanical Equipment

JOHN O'BRIEN BOILER WORKS CO.

St. Louis, Mo.



Four Types of **WATER TUBE BOILERS** *also* **TUBULAR BOILERS**

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KEELER BOILERS

Water Tube
Return Tubular
Cross Drum

For safety, simplicity, durability, high operating efficiency and low operating costs, Keeler Boilers have gained an enviable reputation acquired thru 56 years of boiler building.

Catalog of either type on request

E. KEELER CO., Williamsport, Pa.
Established 1864

Branches: New York, Philadelphia, Boston, Pittsburgh, Buffalo, Chicago

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TRADE-MARK

REDUCE

Boiler Room Costs!

Use the Coupon

THE WICKES BOILER CO.
SAGINAW MICHIGAN, U. S. A.

SALES OFFICES
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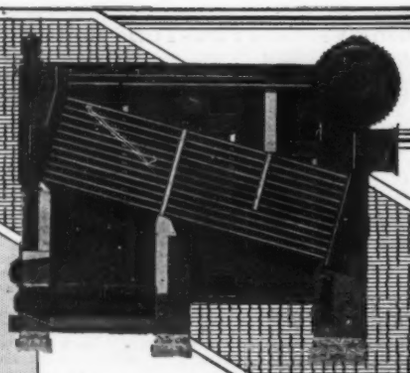
The Wickes Boiler Co.
Saginaw, Michigan.

Gentlemen: Without obligation on my part, I would like to read your helpful bulletins for reducing boiler room costs.

Bulletin 2. The Steam Boiler Analyst.
Bulletin 3. Reducing Costs in the Boiler Room.
Bulletin 4. Magnitude and Prevention of Air Infiltration Losses.
Bulletin 5. Saving Coal in Steam Power Plants.
Bulletin 6. The Utilization of Waste Heat for Steam Generation.
Bulletin 7. The Wickes Horizontal Cross Drum Water Tube Boiler.

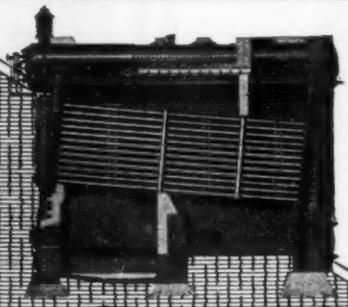
Name .....
Business Address .....
Home Address .....
Date .....
D A.S.M.E.—24

A.S.M.E. CODE BOILERS



The Casey-Hedges Boilers

are the result of years of experience in the design and construction of all types of boilers. They are built to conform with the standards of the A.S.M.E. Boiler Code—they are safe, economical and durable.

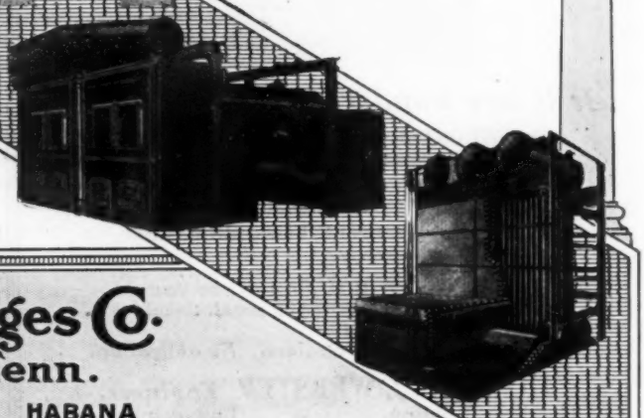


They are efficient and durable

All types of Casey-Hedges Boilers are designed to give the maximum of horse power with the minimum of fuel consumption.

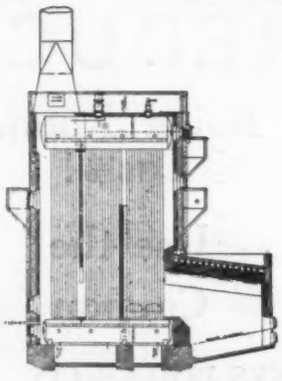
Let our engineering department assist you in selecting your next unit.

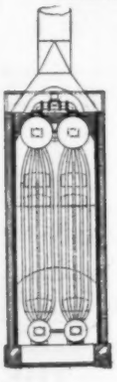
See Our Data in 1924-25 A.S.M.E. Condensed Catalogues of Mechanical Equipment



The Casey-Hedges Co.
Chattanooga, Tenn.
CHICAGO NEW YORK HABANA

TANKS BREECHINGS STACKS





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Lasting efficiency

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Fool-proof baffles

No "special" parts

Send your inquiry

Baffles are self-supporting

MORRISON BOILER CO.
CLEVELAND, OHIO

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29 West 39th Street New York

Local Sections are established and conduct professional, civic and social activities in the following 62 centres:

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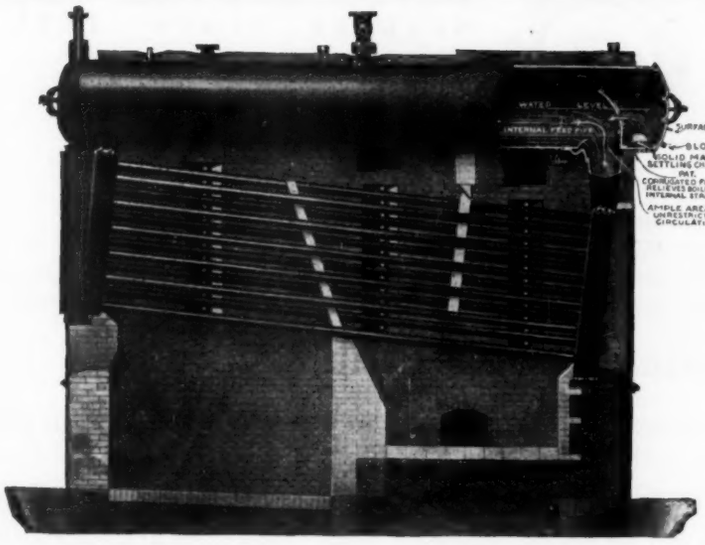
Waterbury
Western Massachusetts
Springfield
Western Washington
Seattle
Worcester

Reports of these activities appear currently in the A.S.M.E. NEWS

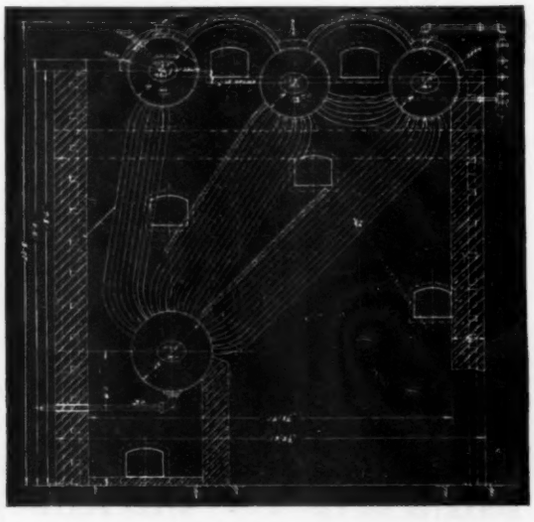
UNION WATER TUBE BOILERS



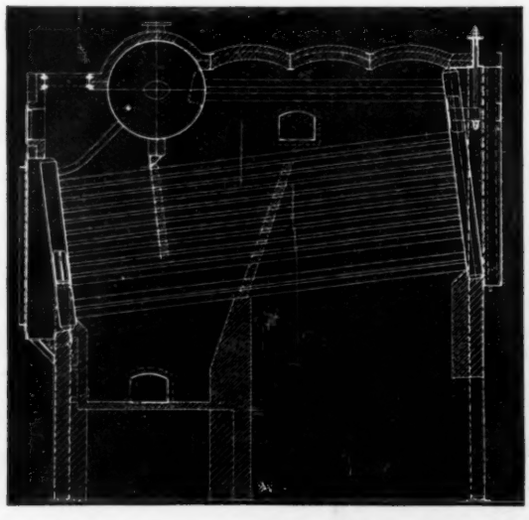
Standard UNION Horizontal Longitudinal Drum Water Tube Boiler, incorporating in its design the distinctive features shown in the cut opposite. These, and other features make for high efficiency, safety, long periods of continuous service and low maintenance.

For nearly forty years we have been concentrating on the development and manufacture of high pressure steel boilers exclusively, and we offer the UNION Water Tube Boilers in both the horizontal straight tube longitudinal and cross drum designs and the vertical bent tube types, for pressures up to 400 lbs. in practically all sizes.

We have one of the largest and most modern boiler manufacturing plants, with sales representatives in all principal cities to serve you.



Above shows the UNION Bent Tube Vertical Type Boiler. We make this in two, three and four-drum designs, depending on service, conditions and specifications.



This shows the UNION Horizontal Cross Drum Type Water Tube Boilers, with all of the above mentioned distinctive features in the Longitudinal Drum Boiler.

UNION IRON WORKS
ERIE - PA.

THE BABCOCK & WILCOX COMPANY

85 LIBERTY STREET, NEW YORK

Builders since 1868 of Water Tube Boilers of continuing reliability

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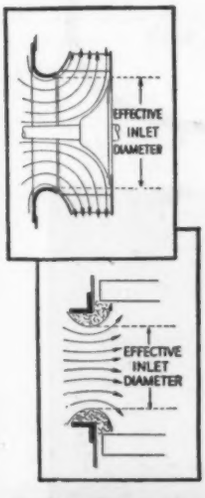
The Engineering Societies Library

One of the largest collections of engineering literature in the world is that found in the Engineering Societies Library, 29 West 39th Street, New York.

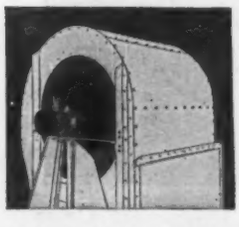
It comprises 150,000 volumes, including many rare and valuable reference works not readily accessible elsewhere. Over 1,300 technical journals and magazines are regularly received, including practically every important engineering journal published in the civil, mechanical, electrical, and mining fields.

The library is open from 9 a. m. to 10 p. m. with trained librarians in constant attendance. Its resources are at the service of the engineering and scientific public



Note the Difference!

Compare these charts. They explain why American Blower High Speed Fans deliver more air at better pressure with less power than any ordinary fan possibly can. Write for our mechanical draft bulletins.



(490)

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CANADIAN SIROCCO COMPANY, LIMITED WINDSOR, ONTARIO

American Blower

VENTILATING, HEATING, AIR CONDITIONING, DRYING, MECHANICAL DRAFT
Manufacturers of all Types of Air-Handling Equipment — Since 1881

Save Auxiliary Power

GREEN'S HI-EFFICIENCY HI-SPEED RADIAL FLOW FANS

For

MECHANICAL DRAFT

GREEN'S

RADIAL FLOW

AND

STEEL PLATE FANS

MEET MODERN BOILER ROOM REQUIREMENTS

BULLETIN No. 127 - - STEEL PLATE
BULLETIN No. 152 - - RADIAL FLOW

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THE GREEN FUEL ECONOMIZER CO.
BEACON, N.Y.

316 POWER Vol. 60, No. 9

MODERN plant designed to supply electrical energy, compressed air and heating steam for the operation of an activated sewage disposal plant. Steam supply for heating sludge and recovery of heat from purified sewage made an interesting problem in design.

Power Plant of Milwaukee Sewage Disposal Works

AFTER years of study and practical demonstration in a testing plant, the City of Milwaukee has developed one of the most modern and efficient sewage-disposal systems in the country. It is to be operated on the activated sewage principle with numerous innovations to facilitate the process, including the recovery of sludge for the making of fertilizer. The project is now nearing completion [illegible] operation will serve in [illegible] from the solids filtered out of the sludge, put before the designer the problem of a power plant containing air-compressor equipment, turbo-alternators for driving pumps, filter drums, screens, conveyors, together with the operation of drying equipment and the co-ordinating of a seasonal heating demand, resulting from the necessity of heating sludge before filtering in cold weather, with the attending power requirement. The [illegible] and 2,000,000 gal. daily from a temperature

[illegible] surface to grate area..	68 to 1
[illegible]	3 to 7 hp. vertical [illegible]

FORCED-DRAFT EQUIPMENT

Manufacturer	B. F. Sturtevant Co.
Number of fans	4
Type	No. 75 turbovane
Capacity of fan, cu.ft. per min.	21,700
Drive	40 hp. Sturtevant turbine
Control	Pressure governor

INDUCED-DRAFT FANS

Manufacturer	B. F. Sturtevant Co.
Number of fans	2
Type	Multivane
Capacity per fan, cu.ft. per min.	53,330
Drive	50 hp. Sturtevant vertical engine

ECONOMIZERS

Manufacturer	B. F. Sturtevant Co.
Number	2
Effective surface, sq.ft.	8,500
Ratio economizer surface to steam-making surface, per cent	54

CHIMNEY

[illegible] Alphons [illegible]

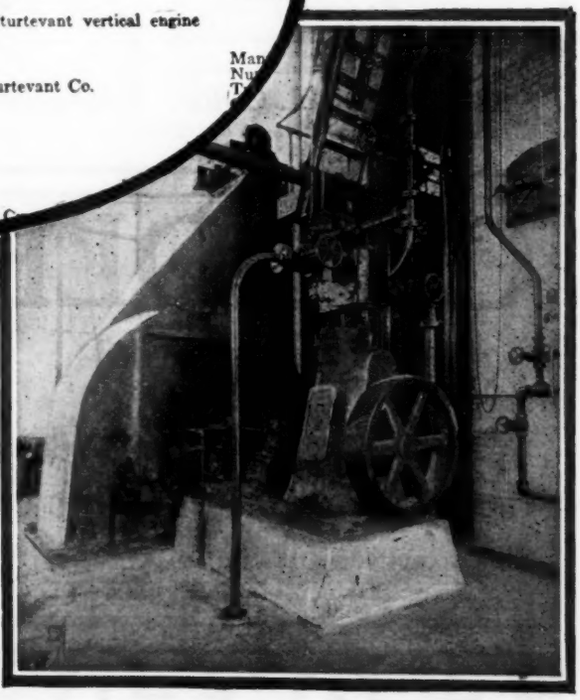
[illegible] Was[illegible] per Conde[illegible] Remov[illegible] Drive[illegible]

Vacuum
Oil-filter
Oil filter

Man[illegible] Nu[illegible] T[illegible]

See POWER, August 26, 1924, page 316.

Photo of one of the Sturtevant induced draft fans driven by a Sturtevant engine.



Another Case of Undivided Responsibility

The designers of this plant decided as far as possible to avoid the annoyance of dividing the responsibility between manufacturers. Sturtevant Economizers, Forced and Induced Draft Fans together with their driving units were installed and the designers look to one manufacturer for service and satisfactory operation.

Our engineering service department will gladly co-operate with you in the selection of the equipment best suited to your needs.

B. F. STURTEVANT COMPANY

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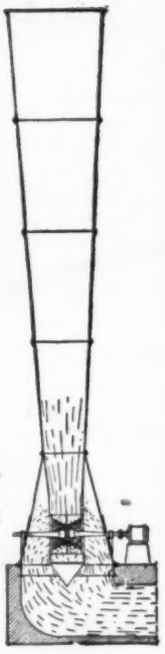
THERMIX

AIR HEATER

A Plate Heater for preheating air of combustion with waste heat from flue gas and for producing clean heated air for industrial drying and heating purposes.

Thermix Plates are held together by a patented construction using plain commercial steel plates neither riveted, welded nor machined.



PRAT-DANIEL
CONVERGENT-DIVERGENT
STACK

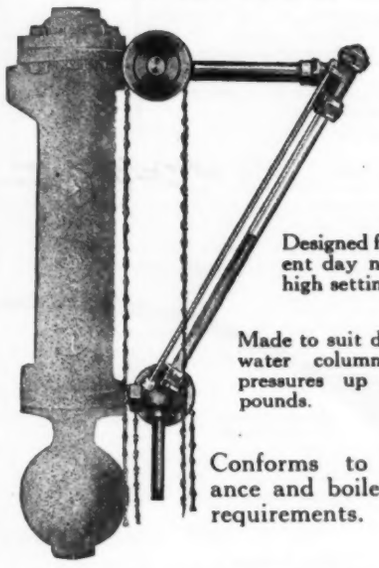
STUDY THIS SKETCH

Low Power Consumption Because:

No back pressure due to a breeching or bends
No power loss from eddy currents
Practically no friction loss in the stack itself

PRAT-DANIEL CORP.
101 Park Ave. New York City

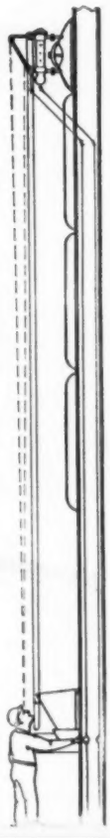
Better be SURE than SORRY
use SESURE INCLINED WATER GAUGES



Designed for present day needs of high settings.

Made to suit different water columns, and pressures up to 600 pounds.

Conforms to insurance and boiler code requirements.



"A boiler is no better than its fittings"

Sole patentee.
Infringers will be prosecuted.

SESURE WATER GAUGE CO.
2 Rector St. New York City

GRINDLE

Pulverized Coal Equipment

Complete Systems designed and installed.
Write for Literature.

GRINDLE FUEL EQUIPMENT CO.
Subsidiary of Whiting Corporation
HARVEY, ILLINOIS (Chicago Suburb)

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Builders of Mechanical Stokers for 36 years
Sales and Service Offices in All Principal Cities
Address Nearest Office
Westinghouse Electric & Mfg. Co.
So. Philadelphia Works, Philadelphia, Pa.

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WESTINGHOUSE ELECTRIC

Westinghouse

SPECIALIZED CONSULTING SERVICE

in ALL BRANCHES of the ENGINEERING FIELD

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Cost Systems
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Invention Development
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Machinery Designing
Management
Manufacturing Methods
Marine
Material Handling
Oil Refineries
Organization
Paper & Pulp Mills
Patent Law
Petroleum
Plant Construction
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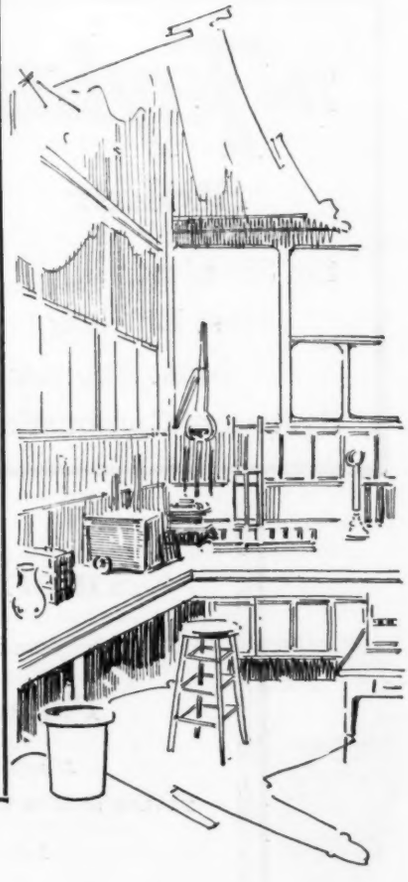
PENNSYLVANIA STEAM COALS

PARDEE

ETERNAL VIGILANCE!

The high standard of preparation set for Pardee and Webster coals is maintained only by constant watchfulness in the mines, at the tipples, and in our laboratories, where the product of each mine undergoes regular inspection.



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STEAM COALS
17 BATTERY PLACE, NEW YORK

PARDEE — Philadelphia, Land Title Bldg. Syracuse, Union Bldg. — Baltimore, Continental Bldg. — WEBSTER — Hartford, 36 Pearl Street Boston, 141 Milk Street

WEBSTER SELECTED
SMITHING COAL

WEBSTER

You can't get blood out of a stone; but.....

You can get a lot of heat out of low grade coal, if you burn it on the TAYLOR STOKER

That is one reason why the number of Taylor installations in the Mid-West has grown and still continues to grow at a remarkable rate.

Another reason is that the Taylor Stoker has been developed to the point where it handles the clinkering Western coals without the slightest difficulty.

The Indiana Service Corp., Ft. Wayne, Ind., for instance burns Indiana coal, generally regarded as hard to handle on stokers.

"The Taylor saved our lives this winter (1923-1924) when the load jumped to 20,000 kw," they say and comment on the ease of operation, little attention required, and cleanliness of fires.

Consumers Power Co., Grand Rapids, Mich.; Dayton Power & Light Co.; Fort Dodge Gas and Electric, Muscatine Lighting Co., Northern Ohio Traction and Light Co., Iowa Railway and Light Co., Cedar Rapids, Iowa; Peoples Gas and Electric Company, Mason City, Iowa are just a few of the many other plants that are burning Mid-Western coals without difficulty while maintaining high efficiencies on the New Taylor Stoker.

The Taylor Stoker

the Simplest,
Most Efficient,
Most Economic
System of Combustion

Do you know the NEW Taylor Stoker? Every power plant Executive and Engineer will be interested in the many radically new features of design that make the New Taylor, the simplest, most efficient and most economic system of combustion. They are all clearly and concisely pictured in the New Taylor Catalog. The coupon is for your convenience in requesting a copy.

American Engineering Company

Thompson and Cumberland Sts.

Philadelphia, Pa.

Manufactured in Canada by

TAYLOR STOKER COMPANY, LTD., Toronto, Ont.

Principal Sales Office:

416 Phillips Place, Montreal, Quebec

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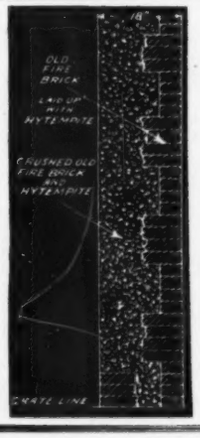
American Engineering Company,
Thompson and Cumberland Sts.

Gentlemen: Without any obligation to me

☐ Send the New Taylor Stoker Catalog.
☐ Send the booklet on the Hell Gate Tests.
☐ Send an Engineering Representative.

Name.....
Company.....
Address.....
Date.....



Use your Old Fire Brick

You can crush your old linings and mix the crushed material with

HYTEMPITE

TO REBUILD YOUR SETTINGS

Note this sidewall section. Large power plants are using this method because it

Prevents Infiltration **Saves Fuel and**
Reduces Radiation **Reduces Maintenance Cost**

Booklet H-109-M tells how

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Hytempite is carried in stock in every industrial center for immediate delivery.

QUIGLEY FURNACE SPECIALTIES CO., Inc.
26 Cortlandt St. New York

MECHANICAL ENGINEERING
November, 1924 CARD INDEX Vol. 46, No. 11

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The Engineering Societies Library

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A STANDARD insulating brick should be 9 inches long by 4½ inches wide by 2½ inches thick,—to conform with the size of standard fire brick. Any variation in the size adds to the cost of installing insulated masonry walls.

Sil-O-Cel Brick have always been noted for their extreme uniformity to size and shape, as compared to any other type of insulating brick available.

Now, a new process has been perfected by means of which each Sil-O-Cel Brick passes through a final machining operation to dress all surfaces smoothly and evenly. This affords a positive check on size and shape, and makes the supremacy of Sil-O-Cel Brick more definite than ever before.

In addition to the greater ease in laying brick insured by this new process, tighter joints between the brick are made possible because no excess mortar is required to provide for irregularities. Sil-O-Cel Brick are laid with thin, tight joints insuring a minimum of heat loss through the joints.

Due to the fact that Sil-O-Cel Brick are manufactured true to standard brick sizes, they cover a greater area per number of brick than do other forms of insulating brick which are under-sized. This amounts to from 8 per cent to 20 per cent greater volume of insulation per thousand brick units in many cases. This fact adds greatly to the economy of using Sil-O-Cel Brick Insulation.

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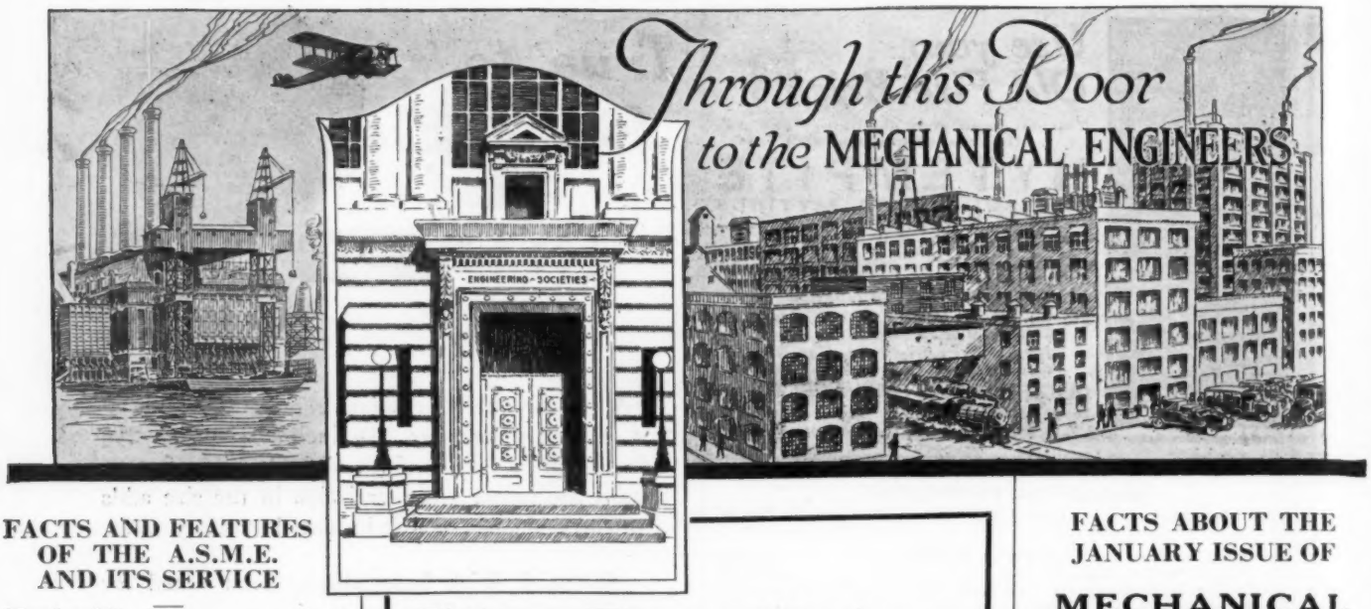
CELITE PRODUCTS LIMITED, NEW BIRKS BLDG., MONTREAL, CANADA
CELITE PRODUCTS CORPORATION, WINDSOR HOUSE, LONDON, S.W.1, ENGLAND



FACTS AND FEATURES OF THE A.S.M.E. AND ITS SERVICE

Membership

17,591 Members.

Meetings

2 General Meetings a year, each of 4 days' duration; Annual Meeting in New York each December; 1925 Spring Meeting in Milwaukee.
3 Regional Meetings of groups of Local Sections at distributed centers.
342 Meetings each year of Local Sections and branches in 64 industrial centers.
347 Meetings each year of Student Branches in 79 Technical Schools and Colleges.

Committees

The following Committees engage the time, thought and energy of over 1,250 members of the Society in the preparation of standards, professional papers, meetings, in research work, and in the dissemination of literature for the advancement of the engineering profession and industry:
69 Technical Committees
37 Administrative Committees
64 Local Section and Branch Executive Committees, besides numerous Special Committees in each Section.
13 Professional Divisions: Aeronautics, Forest Products, Fuels, Machine Shop Practice, Management, Materials Handling, National Defense, Oil and Gas Power, Petroleum, Power, Printing Machinery, Railroads and Textiles.

What the Society Is Doing (In Part)

Advancing the Society's long-established position in engineering and industrial standardization. The importance of this activity has been greatly increased since the organization of the American Engineering Standards Committee.
Continuing the revision of the Power Test Codes of 1915. Seven of the 19 codes, to be known as the Test Codes of 1923, are now available. Another great engineering and professional achievement.
Maintaining the high standing in the development of industrial safety codes long since established by the Society.
Supporting the American Engineering Council, securing the representation of the engineer through his professional body in current legislation affecting him.
Promulgating the new Boiler Code, power boiler section, and continuing two additional codes. An acknowledged signal contribution from the engineering profession.
Supporting national engineering events for promoting the profession, such as the World Congress of Engineers, 1926.

Eighteen Thousand Engineers

from many industries

Who Specify or otherwise Influence the Selection of Mechanical Equipment

will be present in person or spirit at the forthcoming Annual Meeting of

The American Society of Mechanical Engineers

Time and Place

The 1924 A.S.M.E. Annual Meeting will be held as usual at the Engineering Societies Building, New York City, from December 1-4 inclusive.

Program

The technical program for the coming meeting contains a well-balanced list of strong papers. There will be the usual representative papers of interest and value to the power-plant field, which will be presented in four sessions: one on oil burning, one on steam power generation, one on oil engines and gas turbines, and one on hydraulic-power-plant problems. There will also be an impressive array of titles of interest to the engineer who is interested in machine design, machine-shop practice, and management, including those of papers presenting new information about mechanical springs, lubrication, methods of measuring hardness of metals, and gears. Members of the Society interested in management will enjoy the session at which Taylor's classic paper on shop management will be re-presented, and by papers dealing with production control, the design and manufacture of a standard machine, and management development in a modern hosiery plant.

Strength and Proportions of Wheels, Wheel Centers and Hubs, Discharge of Flow-Measuring Nozzles for Air, and the Temperature at which a Liquid Evaporates into a Gas, are subjects of papers which will make up another session of general engineering interest. Three valuable papers on Research and Lubrication will furnish information of importance to designing engineers. The National Defense Division will open its session with an address by Assistant Secretary of War Davis on the Engineering of National Defense. The remainder of the session will be taken up with a consideration of technical problems of ordnance design and ordnance materials.
The Railroad Session will be devoted to a discussion of the Zoelly turbine-driven locomotive. The Textile Division will discuss the development of the spinning frame and the engineer's field in industrial economics. Joint sessions with the Amer. Society of Refrigerating Engineers and the Amer. Society of Safety Engineers will be held during the meeting.

FACTS ABOUT THE JANUARY ISSUE OF MECHANICAL ENGINEERING

Circulation

The circulation of MECHANICAL ENGINEERING is now over 21,000 a month, while additional demands for the January number will require us to print a total of at least 22,000 copies. This circulation represents in one grouping the largest number of prominent engineers identified with the selection and purchase of mechanical equipment ever recorded as readers of a monthly engineering publication.

We Can Help Prepare Your Advertisement

Our Copy Service Department is composed of men who combine advertising experience with an accurate knowledge of engineering matters, and they will be glad to cooperate in preparing copy which will insure a satisfactory representation for your firm. Upon request, a complete advertising suggestion will be submitted for your consideration.

What Space Costs

Rates for single insertions in the January issue are as follows:

Full page	$140.00
Half page	75.00
Quarter page	40.00

(Annual rates on application)

Adequate listings of products in the Classified Index are included if order is received in time to permit of the necessary rearrangements of the Index.

Closing Date—Dec. 3, 1924

Because of the increased size of both editorial and advertising sections in the January number we cannot promise to submit proof on any copy received after December 3. Earlier copy will naturally secure more careful attention than that received at the last minute. Please make your reservation promptly and let us have copy and cuts as soon as possible thereafter.

January, 1925

A.S.M.E. ANNUAL MEETING NUMBER
MECHANICAL ENGINEERING

"More than an advertising medium—a builder of industry."

The January number of MECHANICAL ENGINEERING will contain a complete and accurate report of the 45th Annual Meeting of The American Society of Mechanical Engineers, and it is certain that a great majority of the members of the A.S.M.E., and other readers, will go through their copies very carefully from cover to cover. Those in attendance at the meeting will find in this number a means of preserving the information there obtained; while those not in attendance will depend upon it for an authoritative account of the many important facts that will be brought out.

Each month MECHANICAL ENGINEERING contains the advertisements of leading manufacturers in practically all divisions of mechanical equipment. Many of these advertisers increase their space for the January issue; while many other firms who do not use space regularly recognize the extra importance of this number and arrange for special representation therein. Both in point of editorial interest and in the volume of advertising carried, the A.S.M.E. Annual Meeting Number is always the most noteworthy issue of the year.

The January issue of MECHANICAL ENGINEERING will bring to its advertisers actual and potential results difficult to estimate. It offers advertising value plus, and manufacturers of machinery, apparatus, and materials utilized in industrial and power plants are invited to take advantage of this exceptional opportunity by arranging for appropriate space.

To get a good position, your reservation should be made at once.

FOR REPRESENTATION ADDRESS

THE AMERICAN SOCIETY OF MECHANICAL ENGINEERS

29 West 39th Street New York

BIG ISSUE OF THE YEAR

To Manufacturers of Mechanical Equipment:

MECHANICAL ENGINEERING is the one publication that focuses on the executive men in charge of the production work of the manufacturing and power plants of the country, and the consulting engineers who design, construct and specify equipment for such plants. It is the logical publicity link between the manufacturer of mechanical equipment and the great market of the manufacturing industries.

You are able to meet the readers of MECHANICAL ENGINEERING, including the 17,500 members of The American Society of Mechanical Engineers, under exceptional conditions through the medium of the January A.S.M.E. Annual Meeting Number, so be sure you are properly represented in this issue.

Machine Shop Foundry

Back of every Croll-Reynolds Product

Croll-Reynolds Vertical (Bleeder Type) Heater with Cast-Iron Shell

are the foundries, machine shops, and other manufacturing facilities of our big plant here illustrated, which is located at Weatherly, Pa., (130 miles from New York City) and has a thirty year record of successful operation and continuous growth.

Favorable location, efficient equipment, and a thoroughly-experienced operating personnel, permit an unusually high-grade output, at costs which satisfy the most discriminating buyers.

Croll-Reynolds Eng. Co.

95 Liberty St., New York City

See also our data on page 146 of the newly-issued 1924-25 volume, A.S.M.E. Condensed Catalogues of Mechanical Equipment.

Heaters
Coolers
Deaerators
with floating tube-heads and straight seamless brass or copper tubes. Shells of cast iron or steel plate, designed for either vertical or horizontal installation.

"Evactor" Air Pumps
for removing air effectively from condensers, and maintaining the high vacuums required by modern power plant practice.

Thermo-Compressors
for increasing the pressure of exhaust steam so that it may be used more effectively for heating, evaporating, drying, etc.

Air Measuring Devices
for measuring the amount of air removed from condensers, and thereby enabling excessive leakage to be detected.

Power Plant Castings
special facilities for casting and machining large pipe and pipe fittings.

WATER

WE-FU-GO AND SCAIFE SOFTENING SYSTEMS

Scaife Standardized Softened Water For Boiler Feed and all Industrial Uses.

Scaife Filters for all Purposes

NEW YORK: 26 Cortland St.; CHICAGO: First Nat'l Bank Bldg.

(See Our Data in 1924-25 A.S.M.E. Condensed Catalogues of Mechanical Equipment)

WM. B. SCAIFE & SONS CO. PITTSBURGH, PA.

UNISOL

REG. U.S. PAT. OFF.

We have marketed UNISOL throughout the world for the past 14 years.—ALWAYS ON AN APPROVAL BASIS. We invariably receive repeat orders and check or draft. Should UNISOL fail to correct an undesirable boiler feed water condition—It is time to stop trying to correct it.

UNISOL maintains complete solubility and suspension, the two required factors of feed water treatment.

UNISOL is GUARANTEED to fulfil ALL requirements under ALL conditions.

Pamphlet on request.

UNISOL MFG. CO. Jersey City, N. J.

Water Softeners

Hot—Cold—Intermittent—Zeolite

Complete Engineering Service

Everything Built Complete in Our Own Plant

GRAVER *Corporation*

310 Todd Ave., East Chicago, Ind.

WATER PURIFICATION EQUIPMENT

of every type—for every purpose

Whatever your water problem may be, it can be handled most economically and efficiently by International equipment and the organization behind it—an organization that has devoted over 20 years exclusively to handling water purification problems.

INTERNATIONAL FILTER CO.

333 WEST 25TH PLACE CHICAGO

New York Pittsburgh San Francisco Los Angeles

Canadian International Filter Co., Ltd., Toronto

INTERNATIONAL

LIME BARIUM-CARBONATE

WATER SOFTENERS

for **INDUSTRIAL PURPOSES**

Engineers in Water Purification

REISERT

AUTOMATIC WATER PURIFYING COMPANY

23 East 26th St., New York, N. Y.

REG. U.S. TRADE MARK

Wayne

ORIGINAL RAPID-RATE

WATER SOFTENERS

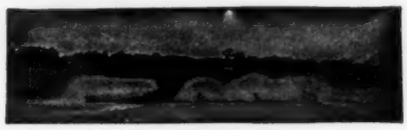
Rapid-Rate Filters

Write for Booklets

Wayne Tank & Pump Company

709 Canal Street Fort Wayne, Indiana

SPRAY POND



VERSUS

COOLING TOWER—*Which?*

Which type of water cooling device is better for your plant?

The answer depends on the nature of the duty, the climate, and the amount and value of available space.

No sweeping claim of superiority for either type can be justified in the absence of specific information covering plant conditions.

We investigate, then quote you on best type for your particular service.

THE COOLING TOWER CO., INC.

17 John St., New York

COOLING TOWERS AIR WASHERS

SPRAY NOZZLE SYSTEMS

Write for Catalogue 9A

See Our Data in 1924-25 A.S.M.E. Condensed Catalogues of Mechanical Equipment

The Engineering Societies Library

ONE of the largest collections of engineering literature in the world is that found in the Engineering Societies Library, 29 West 39th Street, New York.

It comprises 150,000 volumes, including many rare and valuable reference works not readily accessible elsewhere. Over 1,300 technical journals and magazines are regularly received, including practically every important engineering journal in the civil, mechanical, electrical and mining fields.

The library is open from 9 a.m. to 10 p.m., with trained librarians in constant attendance. Its resources are at the service of the engineering and scientific public.

THE "CONCO" CLEANER
The Tool for

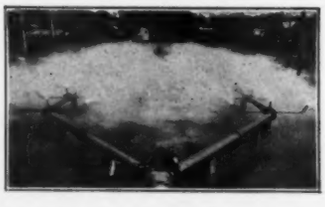
CONDENSER CLEANING

Made for ¾ and 1 inch tubes—of correct design and highly developed—over 10,000 sold—mostly on re-orders.

A sample furnished on request.

CONDENSER CLEANERS MFG. CO.

422 First Avenue Pittsburgh, Pa.



Plan your cooling system now in order to run condensing next spring.

KOERTING SPRAY NOZZLES

give maximum cooling with minimum power.

Ask Condenser Department for Bulletin 5-N

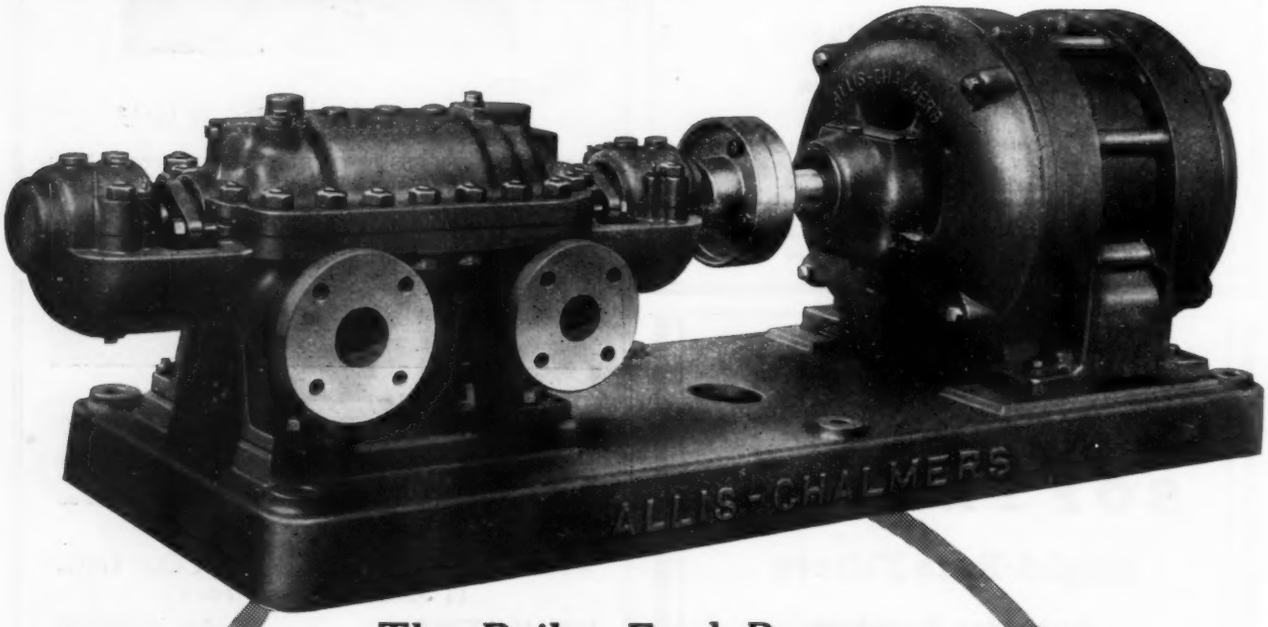
See Our Data in 1924-25 A.S.M.E. Condensed Catalogues of Mechanical Equipment

KOERTING

1166 THOMPSON STR

PHILADELPHIA·PA

Allis-Chalmers Centrifugal Boiler Feed Pumps



The Boiler Feed Pumps of undivided responsibility

This means one Company selects and stands back of a complete unit of its own manufacture consisting of both pump and drive. The pump illustrated is the smallest size we have recently developed for feeding boilers of from seven hundred fifty to sixteen hundred boiler horse power. It is built with the same care and along the same lines as our well known boiler feed pumps of larger sizes. Your inquiry will bring you our recommendations for the best Centrifugal Pumping Unit for boiler feed or other service.

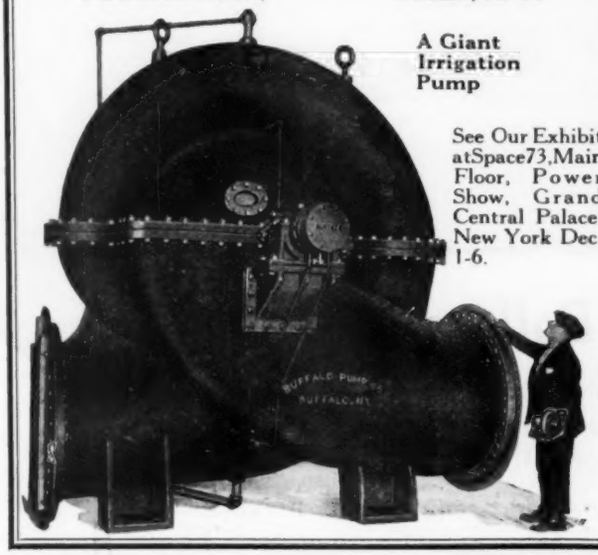
ALLIS-CHALMERS

MILWAUKEE, WIS. U. S. A.

"Buffalo" PUMPS

All Sizes
Every Kind
For Any Service

Buffalo Steam Pump Company
148 Mortimer St., Buffalo, N. Y.

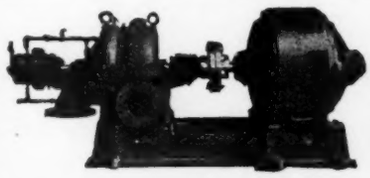


A Giant Irrigation Pump

See Our Exhibit at Space 73, Main Floor, Power Show, Grand Central Palace, New York Dec. 1-6.

MORRIS
CENTRIFUGAL PUMPS

Meeting common and uncommon pumping requirements has been our specialty for over three generations.



We furnish complete unit or pump only for steam, electric, belt, gear or rope drive. Reasonable price and performance guarantee, justify you in insisting on a Morris quotation and giving it preference.

MORRIS MACHINE WORKS, BALDWINSVILLE, N. Y.

LAMMERT ROTARY PUMPS

Dry Vacuum — Air Pressure

For unlimited service—maintaining dry vacuums to 29½" without pulsation or vibration; delivering a constant flow of air at pressures to 25 pounds for blowing, spraying or agitating.

Capacities range from 3½ cu. ft. to 700 cu. ft. per minute—belt or motor drive.

Catalog will be mailed on request

LAMMERT & MANN CO.
Mechanical Engineers
Rotary Pumps *Special Machinery*
223 No. Wood Street Chicago, Ill.

GOULDS

A Type for every Service

Bulletin on request

See Our Data in 1924-25 A.S.M.E. Condensed Catalogues of Mechanical Equipment

THE GOULDS MANUFACTURING COMPANY
SENECA FALLS, N. Y.

PUMPS

Send for this Bulletin

Just off the Press!

Illustrates an excellent line of centrifugal pumps, and in addition, contains helpful data and convenient tabular matter of interest to the engineer.

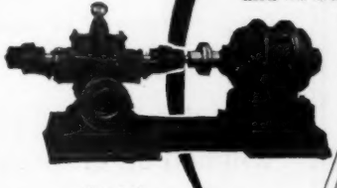
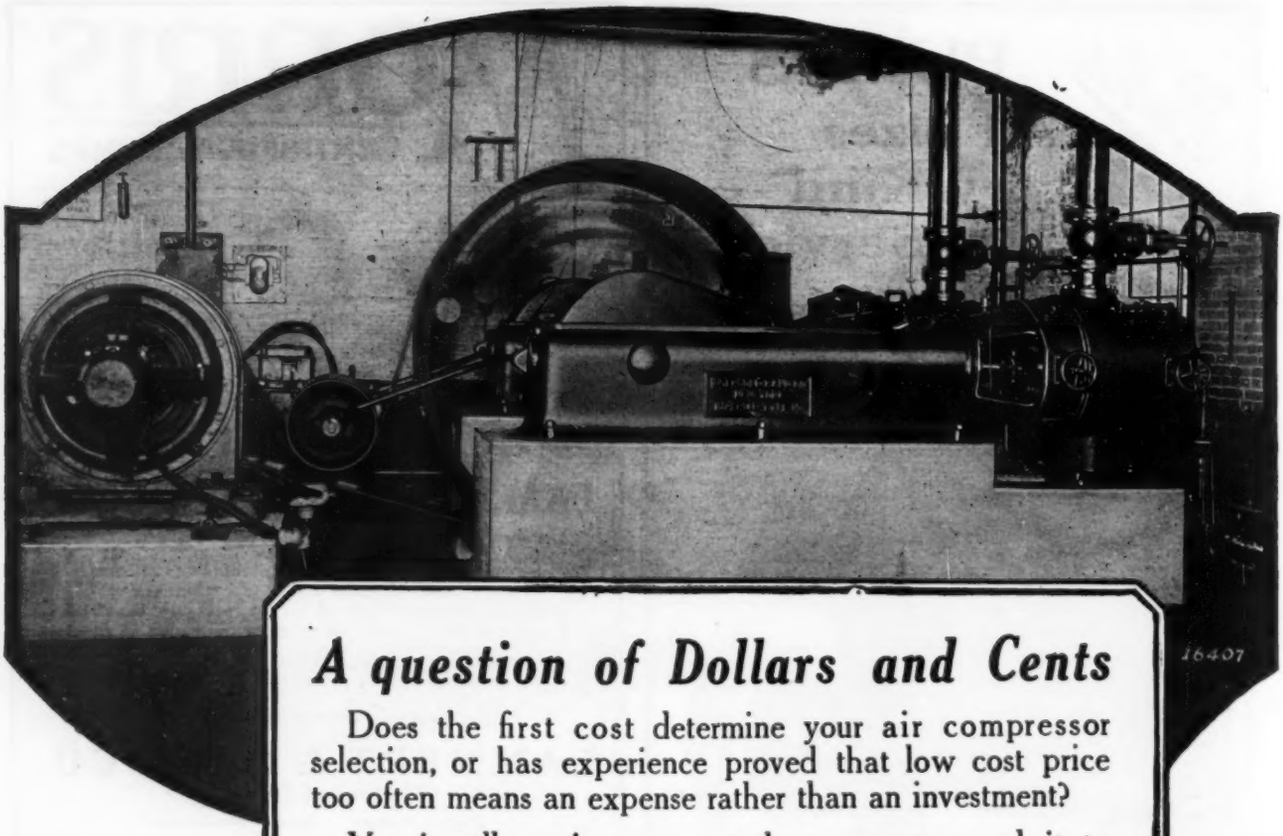


Fig. 510
Taber S L type Double Suction Centrifugal Pump.

Ask for Bulletin No. 30-C Write to

TABER PUMP CO. Buffalo, N.Y.

Builders of Rotary and Centrifugal Pumps.



A question of Dollars and Cents

Does the first cost determine your air compressor selection, or has experience proved that low cost price too often means an expense rather than an investment?

You install an air compressor because you need it to increase production and reduce manufacturing costs. This can be done only when the compressor you select is *a machine you can afford to use.*

The efficient compressor is measured by one standard—its ability to actually deliver air at the least cost per cubic foot, taking into account costs of power, attendance and repairs.

Such a compressor is compact and self-contained. It has reliable and automatic regulation so that high operating efficiency is secured at both *full and partial loads.* Lubrication is automatic, and reliable.

In the Ingersoll-Rand Type "XCB" Compressor you will find all of these improved features of design and construction. In its operation you will find there reliability and economy needed to reduce your compressed air costs.

It's a question of dollars and cents — and value received.

Bulletin No. 3142

INGERSOLL-RAND COMPANY - 11 BROADWAY, NEW YORK CITY.

Offices in principal cities the world over

FOR CANADA REFER-CANADIAN INGERSOLL-RAND CO. LIMITED, 260 ST. JAMES STREET, MONTREAL, QUEBEC.

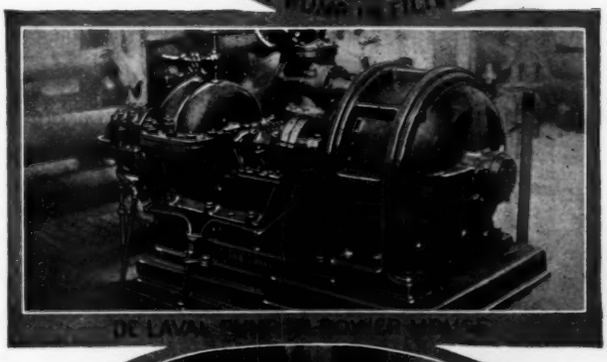
Ingersoll-Rand

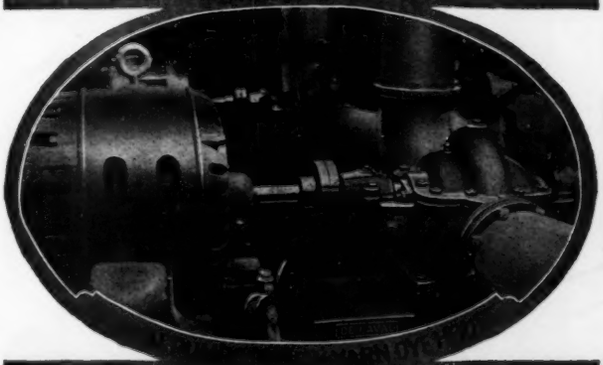
Buy Good Pumps

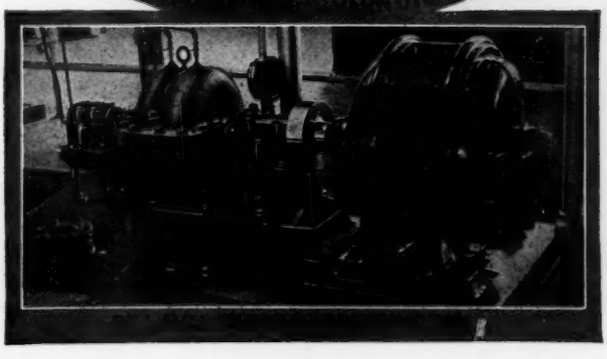
MANAGERS of extensive industrial plants find that it pays to standardize on reliable, high grade equipment. They find also that in a large plant interchangeability is valuable, as are also high efficiency and responsible guarantees.

The managers and engineers of the Cheney Silk Mills, one of the largest and oldest silk manufacturers in the world, carrying materials through every process from raw silk to the finished goods, occupying over 35 acres, and employing 4,500 people, have for these reasons standardized on De LAVAL CENTRIFUGAL PUMPS, some of which are shown in the accompanying illustrations. A recent letter from Cheney Bros. states:

> **"The equipment shown in the photograph in the dressing mill is a De Laval centrifugal pump, No. 12802, Type 2P3, total head 347 ft., speed 3,500 r.p.m., capacity 175 gal. per min., directly connected to G.E. 35-hp. motor, used for pumping water in air washing mechanism in connection with the Parks-Cramer humidifying system. Our engineer in the dressing mill tells us that this pump has given us exceptional service. It operates 24 hours in the day and practically every day in the year except, perhaps, a few days in the summer when the humidity becomes great, making it unnecessary to operate the system. The pump has been used constantly since the mill was built in 1911 and has given entire satisfaction."**







De Laval pumps are themselves standardized, in that all parts are made to limit gages, so that renewals ordered from the factory can be inserted by unskilled men. The horizontally split casing is used throughout, and all internal parts are at once accessible upon lifting the casing covers, and can be removed after loosening the bearing caps. Each pump is fully guaranteed as to delivery, efficiency, and other characteristics, and is fully tested before leaving the De Laval works. The workmanship and materials are of the highest grade, insuring long and satisfactory service.

We have a comprehensive centrifugal pump catalog which we would be glad to send to managers, engineers and others interested in securing reliable pumping equipment. Ask for Catalog B-50.

De Laval

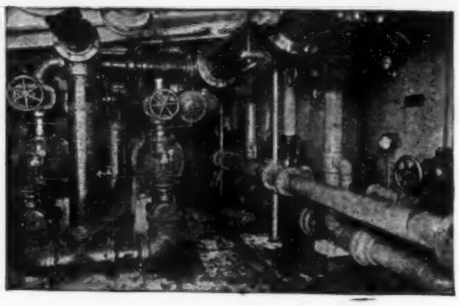
Steam Turbine Co., Trenton, N.J.

Local Offices:—Atlanta, Charlotte, Chicago, Cleveland, Denver, Duluth, Havana, Honolulu, Houston, Indianapolis, Los Angeles, Kansas City, Missoula, Montreal, New York, New Orleans, Philadelphia, Pittsburgh, Salt Lake City, San Francisco, Seattle, Toronto, Vancouver. 373

See Our Data in 1924-25 A.S.M.E. Condensed Catalogues of Mechanical Equipment

KENNEDY

Valves for every power plant service



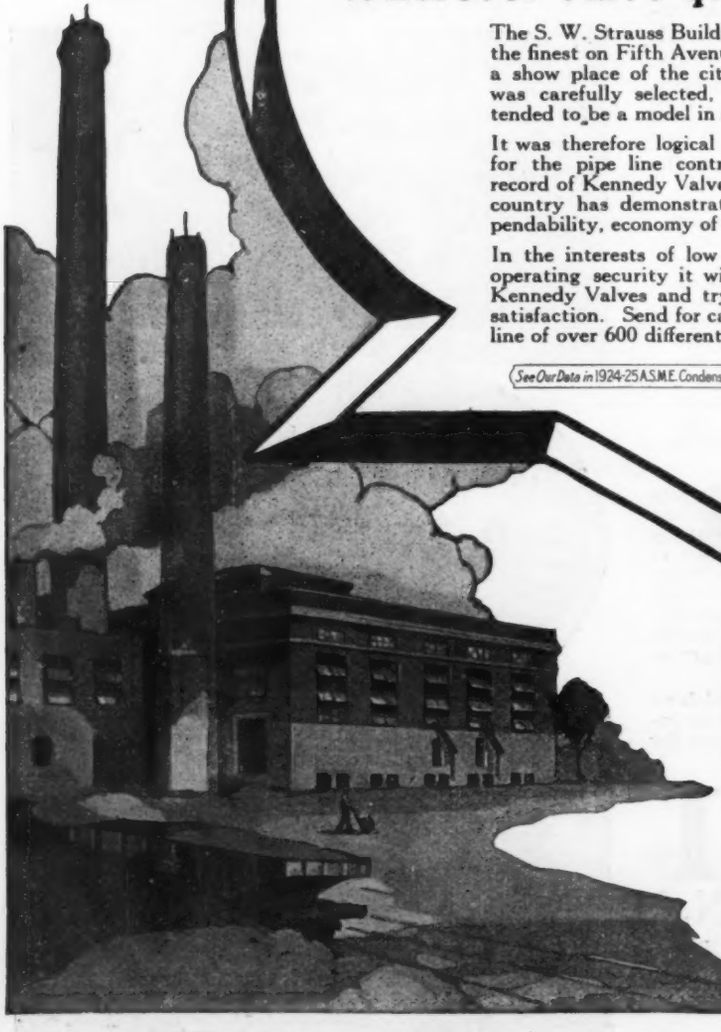
Wherever valve quality is important

The S. W. Strauss Building in New York is one of the finest on Fifth Avenue—which means that it is a show place of the city. All of the equipment was carefully selected, for the building was intended to be a model in every respect.

It was therefore logical to select Kennedy Valves for the pipe line controls, for the half-century record of Kennedy Valve installations all over the country has demonstrated their exceptional dependability, economy of operation, and durability.

In the interests of low operating costs and high operating security it will pay you to investigate Kennedy Valves and try out a few to your own satisfaction. Send for catalog describing the entire line of over 600 different types and sizes.

See Our Data in 1924-25 A.S.M.E. Condensed Catalogues of Mechanical Equipment



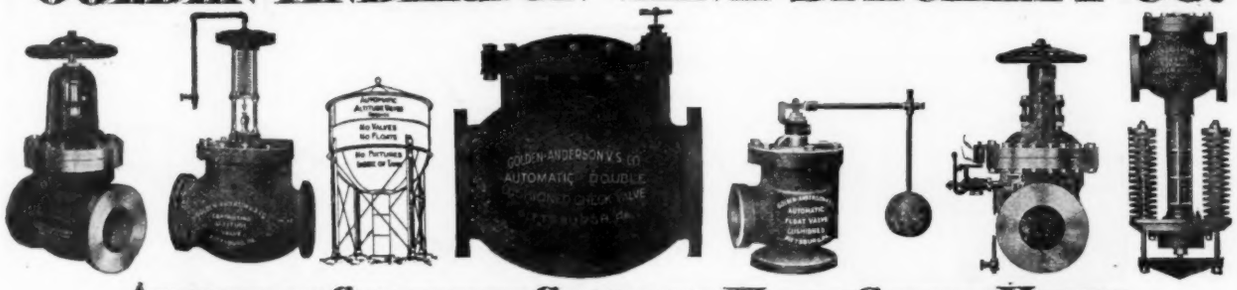
THE KENNEDY VALVE MFG. CO. ELMIRA, N.Y.

Branches and Warehouses

New York, 95 John St. Boston, 47 India St.
Chicago, 218 N. Jefferson St. San Francisco, 448-450 Tenth St.

Sales Offices:
SALT LAKE CITY: 222 Dooly Bldg.
EL PASO: 1103 Noble Street
SEATTLE: 250 Central Bldg.
KANSAS CITY, MO.: 411 American Bank Bldg.
LOS ANGELES: 723 Title Insurance Bldg.
PHILADELPHIA: Hotel Vendig.

GOLDEN-ANDERSON VALVE SPECIALTY CO.



AUTOMATIC CUSHIONED STEAM AND WATER-SERVICE VALVES.

"We Challenge to Test for Merits Any Automatic Steam or Water-Service Valves in the World"

1228 FULTON BUILDING. PITTSBURGH, PA.

CROSBY STEAM SPECIALTIES

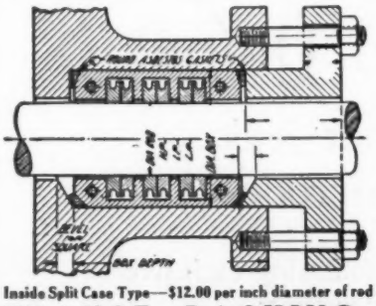
See our data on page 250 in the 1924-25 A.S.M.E. Condensed Catalogues of Mechanical Equipment.

TRADE-MARK ☆ CROSBY ☆

In Principle and Practice
None So Good
Our Name and Trademark is Behind Everything we Make

send for our latest bulletins

BOSTON NEW YORK **CROSBY STEAM GAGE & VALVE CO.** CHICAGO LONDON



FRANCE METALLIC PACKING

for all conditions of service of the better class

Send for Catalog

Inside Split Case Type—$12.00 per inch diameter of rod

FRANCE PACKING COMPANY

6500 Tacony St., Philadelphia, Penna.

See Our Data in 1924-25 A.S.M.E. Condensed Catalogues of Mechanical Equipment

ASHTON

POP VALVES and GAGES

Recognized for their absolutely dependable quality.

Used in the leading high pressure power plants.

Send for Catalog No. 18 which tells all about the full line of ASHTON Specialties.

The Ashton Valve Co.

BOSTON NEW YORK CHICAGO SAN FRANCISCO

2 See Our Data in 1924-25 A.S.M.E. Condensed Catalogues of Mechanical Equipment

FOSTER ENGINEERING CO.

MAIN OFFICE AND FACTORY—NEWARK, N. J.

FOSTER VALVES

Pressure Regulators
Pump Governors
Non-return Stop Valves
Emergency Stop Valves
Float Valves
Fan Engine Regulators
Back Pressure Valves

Turbine Pump Governors
Vacuum Pump Governors
Lever Balanced Valves
Altitude Valves
Elevator Pump Governors
Hyd. Regulating Valves
Water Regulating Valves

FOSTER AUTOMATIC VALVES will be EXHIBITED at the National Exposition of Power and Mechanical Engineering—(POWER SHOW) December 1–6, 1924, New York City, Grand Central Palace,

BOOTH NO. 84

VISIT OUR BOOTH AND GET ACQUAINTED

KIELEY
REGISTERED TRADE MARK

Steam, Water and Air Specialties

HIGH PRESSURE PILOT
REDUCING VALVE—300 lbs. to 10 lbs.

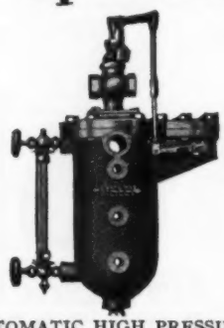
Manufacturers of the
Complete Line

Send for Catalog 1923

KIELEY & MUELLER, Inc.

Main Office and Works

34-38 West Thirteenth Street
New York, N. Y.



AUTOMATIC HIGH PRESSURE
BOILER WATER FEEDER

Opportunity Advertisements

If you desire capital or have it to invest; if you have a patent for sale or development; if you have on hand used machinery for disposal, or if you want such equipment; if you have copies of publications, or a set of drawing instruments to dispose of; in fact, anything to be offered that somebody else may want, or anything wanted that somebody else may have—use a classified advertisement in the Opportunities Section in MECHANICAL ENGINEERING for quick results.

...RATES...

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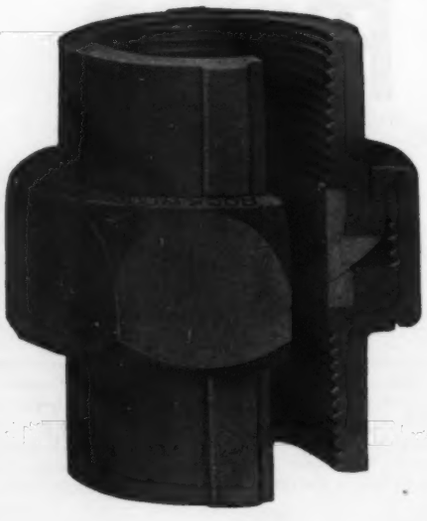

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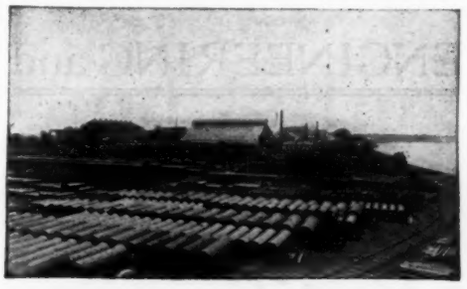

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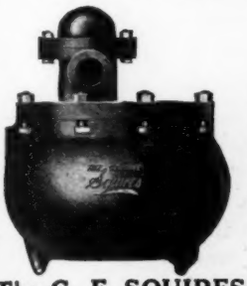

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445

ENGINEERING and INDUSTRIAL STANDARDS

CODE for the Identification of Piping Systems

The purpose of this Committee is readily conveyed by its name and its work has been divided among the following sub-committees:

1. Sub-committee on Identification by Colors, Frank P. Ingalls, Chairman
2. Sub-committee on Classification, Crosby Field, Chairman
3. Sub-committee on Identification Markings other than Color, William S. Morrison, Chairman

and there is also an Executive Committee, the personnel of which consists of the Chairman and Secretary of the Sectional Committee and the Chairmen of the three Sub-committees.

Sectional Committee Formed

The organization of the Sectional Committee on a Code for the Identification of Piping Systems took place on June 14, 1922 under the procedure of the American Engineering Standards Committee. The National Safety Council and The American Society of Mechanical Engineers are Joint Sponsors for this project. The Committee now consisting of 35 members representing 30 organizations has for its Chairman, Mr. Amos S. Hebble, Superintending Engineer, Southern Pacific Company, American S. S. Lines, Pier 49, North River, New York, N. Y., and for its Secretary, Mr. Ira G. Hoagland, Secretary, National Automatic Sprinkler Assn., 80 Maiden Lane, New York, N. Y.

In December 1923 the Sub-Committee on Identification by Colors completed its report. In January 1924 the Sectional Committee reviewed it but decided to take no action concerning it until the report of the Sub-Committee on Identification Markings other than Color was in its hands. Recently this last named report was sent to the members of the entire Sectional Committee in mimeograph form so it is expected that shortly both these reports will be finally discussed and voted on, after which they will be printed in pamphlet form. To these will be added the report of the Sub-Committee on Classification which is progressing rapidly.

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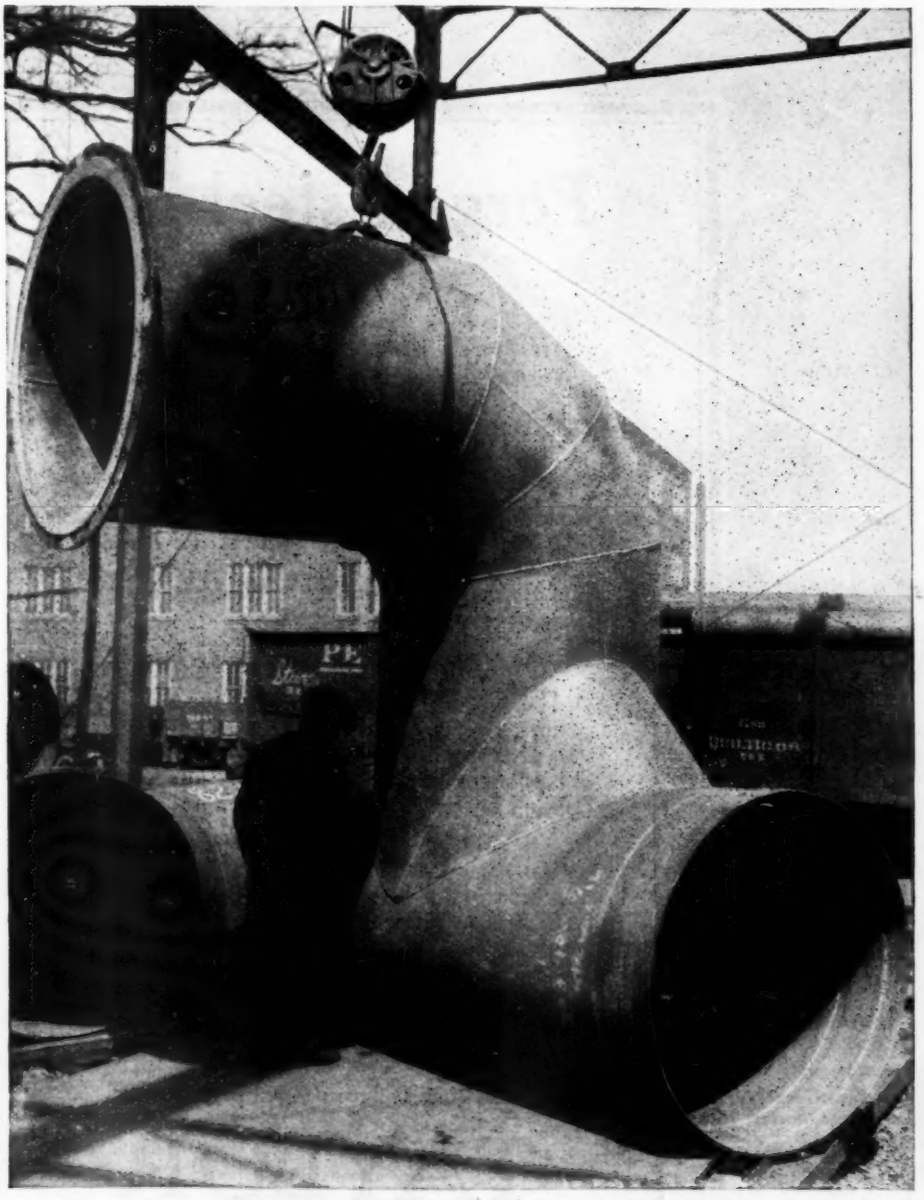

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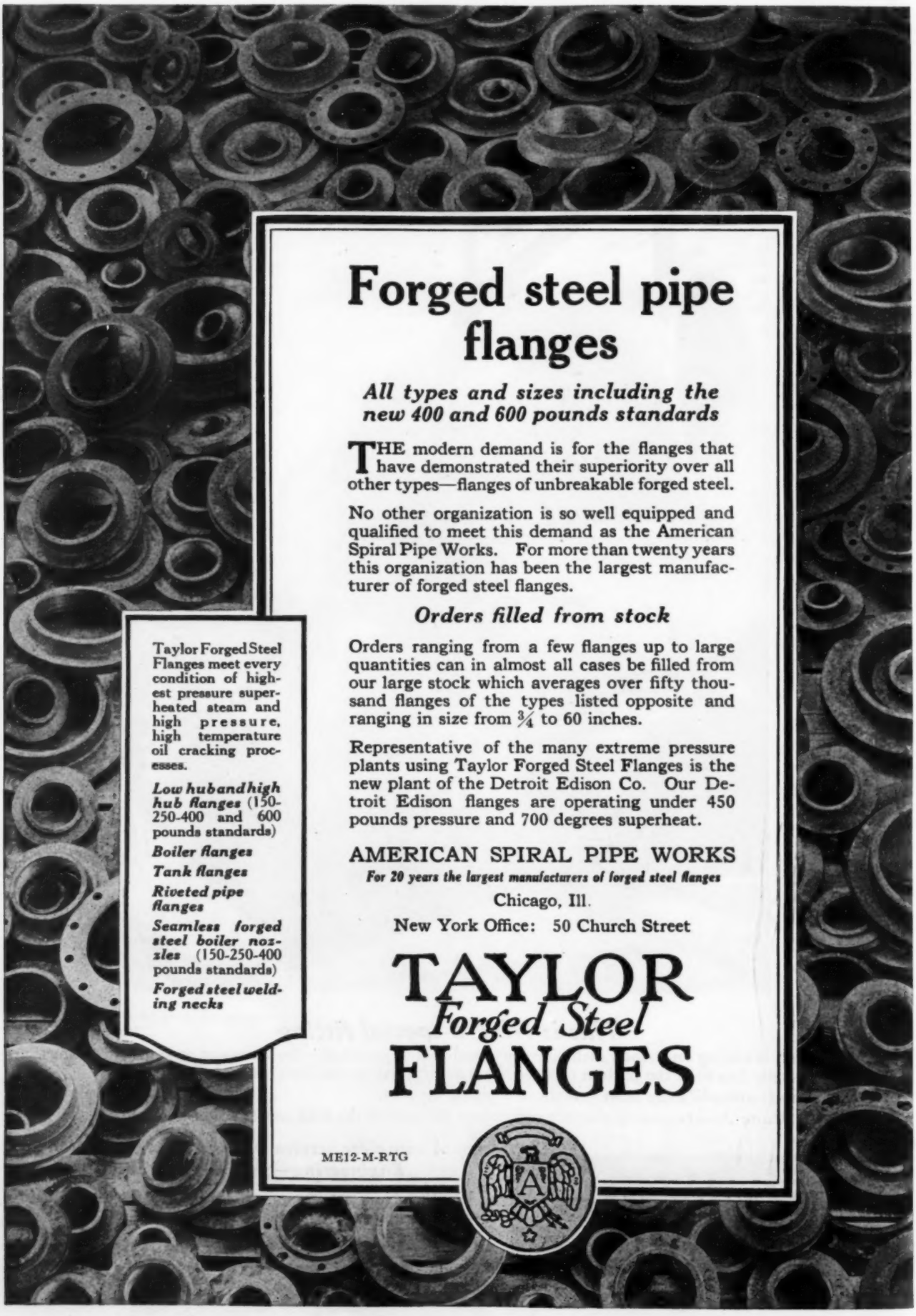

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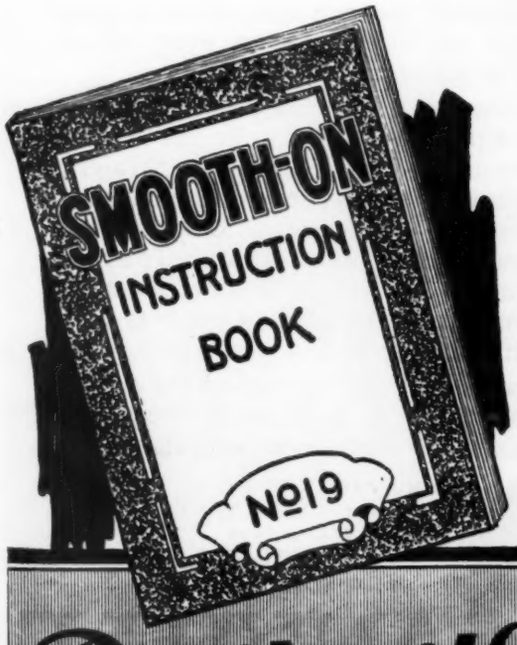

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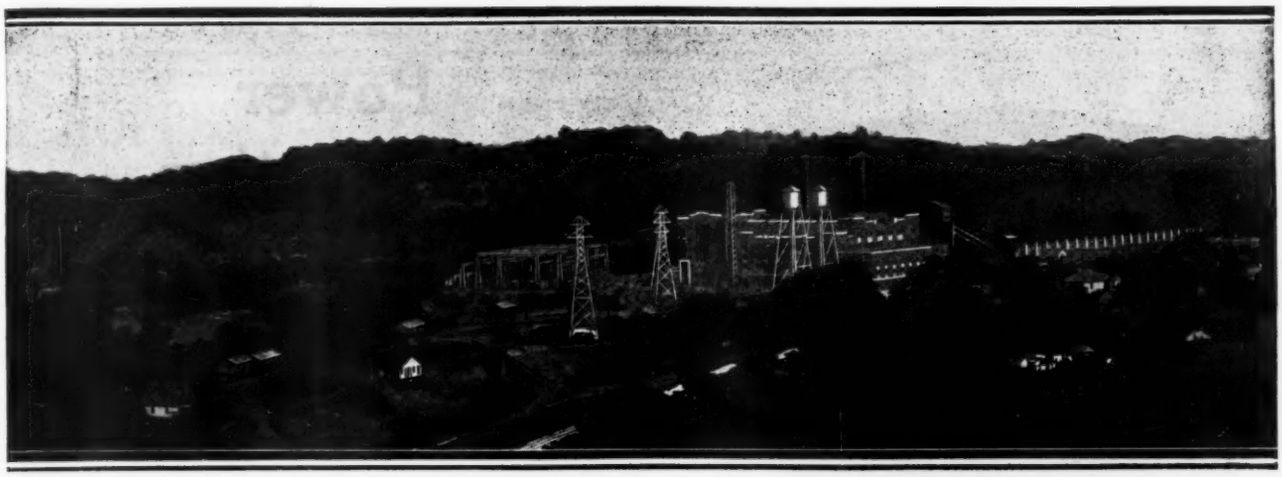

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Another power-giant uses Carey Hi-Temp

A few outstanding installations of Carey Hi-Temp in oil refineries and central stations

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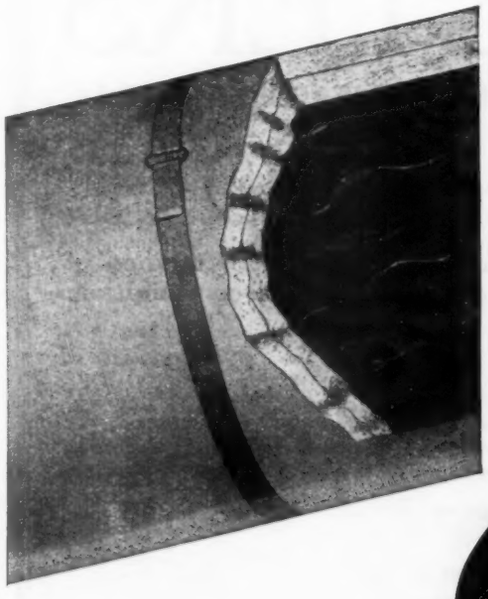

THE development of higher temperatures is progressing rapidly, and even more rapidly in oil production than in power-development.

Central stations are therefore watching with interest the result of using special insulations and other materials in the extreme superheat used in oil refining, and the notable service of Carey Hi-Temp in standing these high temperatures without deterioration or loss of efficiency has already brought about its adoption in many of the central stations and industrial power plants recently constructed.

The Philo, Ohio, plant of the Ohio Power Company, illustrated above, is one of these recent Carey Hi-Temp installations. Superheat temperature is 700 to 800 degrees and the high pressure lines are covered with two inches of Carey Hi-Temp and two inches of Carey 85% Magnesia.

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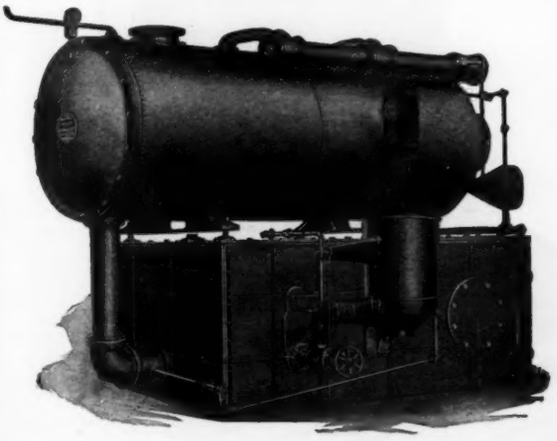

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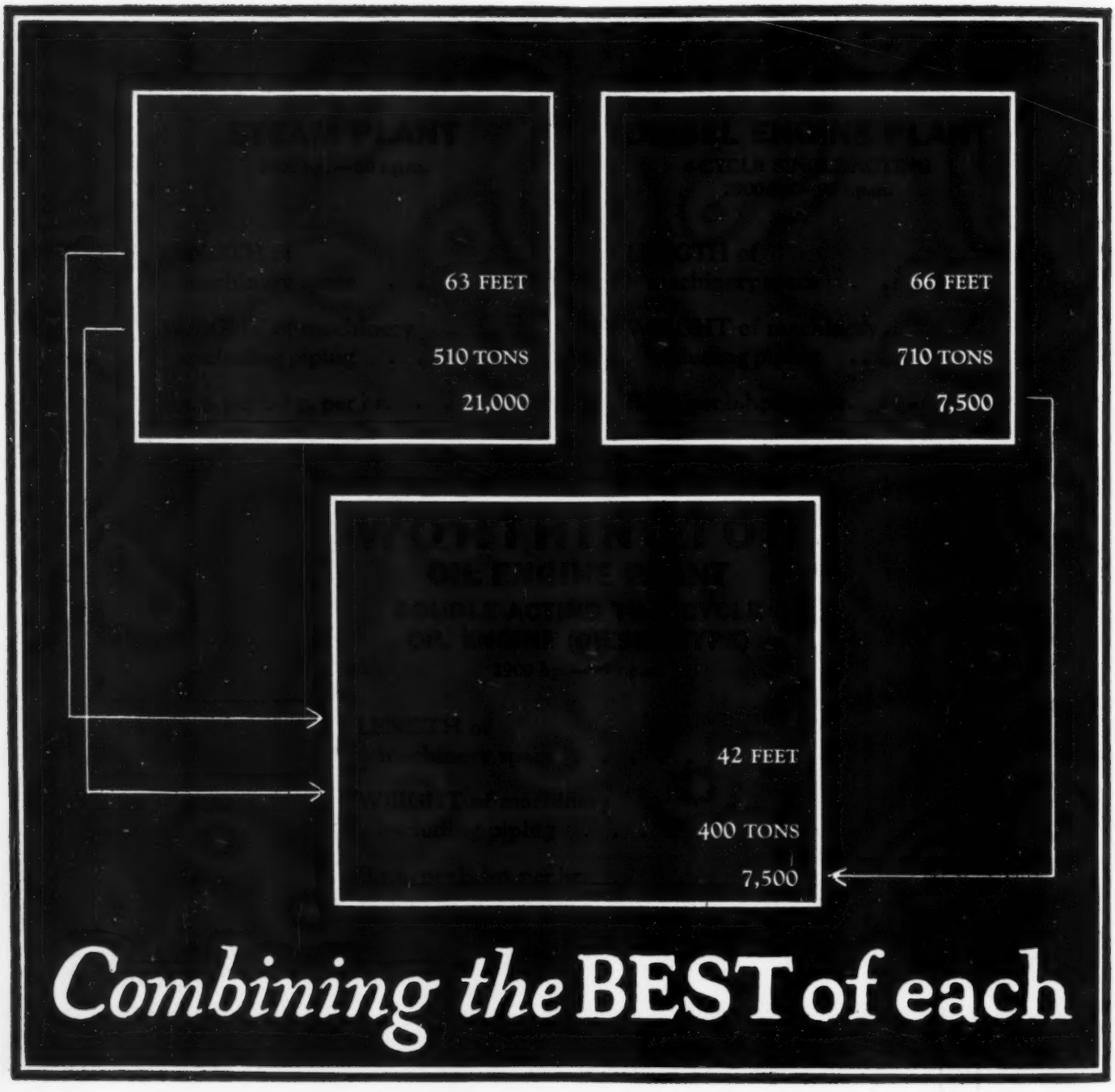

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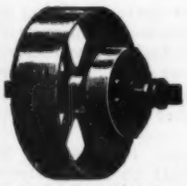

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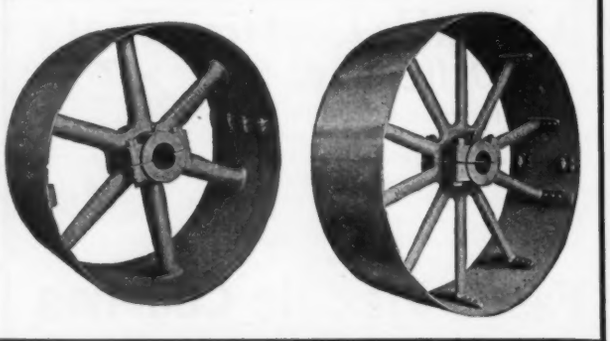

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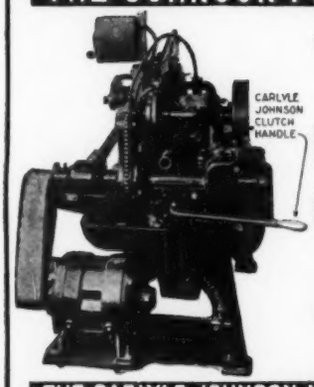

On this new motor drive machine, shown through the courtesy of the Bilton Machine Tool Co., of Bridgeport, Conn., a special No. 4 Single Cut-off Coupling Clutch is mounted on a short driving shaft, which is keyed to the clutch hub.

Clutch Speed 550 R. P. M.

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Single Clutch with Pulley

THE CARLYLE JOHNSON MACHINE CO. MANCHESTER CONN.

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in ALL BRANCHES of the ENGINEERING FIELD

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FOR ANY SERVICE ANY LOAD

Self contained, running in oil, simple of adjustment, and adaptable to all types of special machines. The Cleveland has no parts to work loose, burn out or damage. It engages gradually, releases instantly and all parts are accurately and interchangeably made.

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The whole power of an automobile passes through a universal joint of fabric and rubber.

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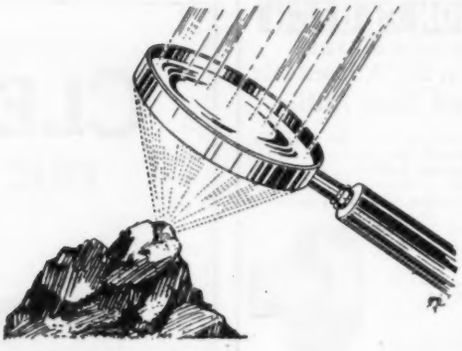
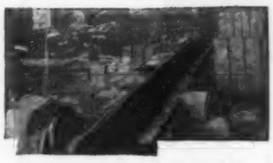


YOU CAN'T SMELT MUCH METAL WITH A MAGNIFYING GLASS ! ! !

—And you need more powerful belts when you tackle jobs where heat, steam, oil and exposure affect the belting. Even the best rubber and leather belts cannot give knock-down-drag-out service on jobs that call for Stitched Cotton Duck Belts. Gandy Belt is *not* a substitute. It is built for use on conveyors, elevators, drives; under conditions that make ordinary belting inadequate. Gandy Belt is backed by a record of almost half a century of such service to industry. Let us tell you more about it. Write for complete information and samples of Gandy Belt. *Tough and pliable—but not expensive.*

THREE TYPES: Gandy Stitched Cotton Duck Belting, for ordinary indoor work. Thermo-Gandy, specially treated for outdoor installations and extremes of heat, cold, steam, etc. Gandy Wax-Impregnated Belt; white, washable, for conveying food products in bulk.



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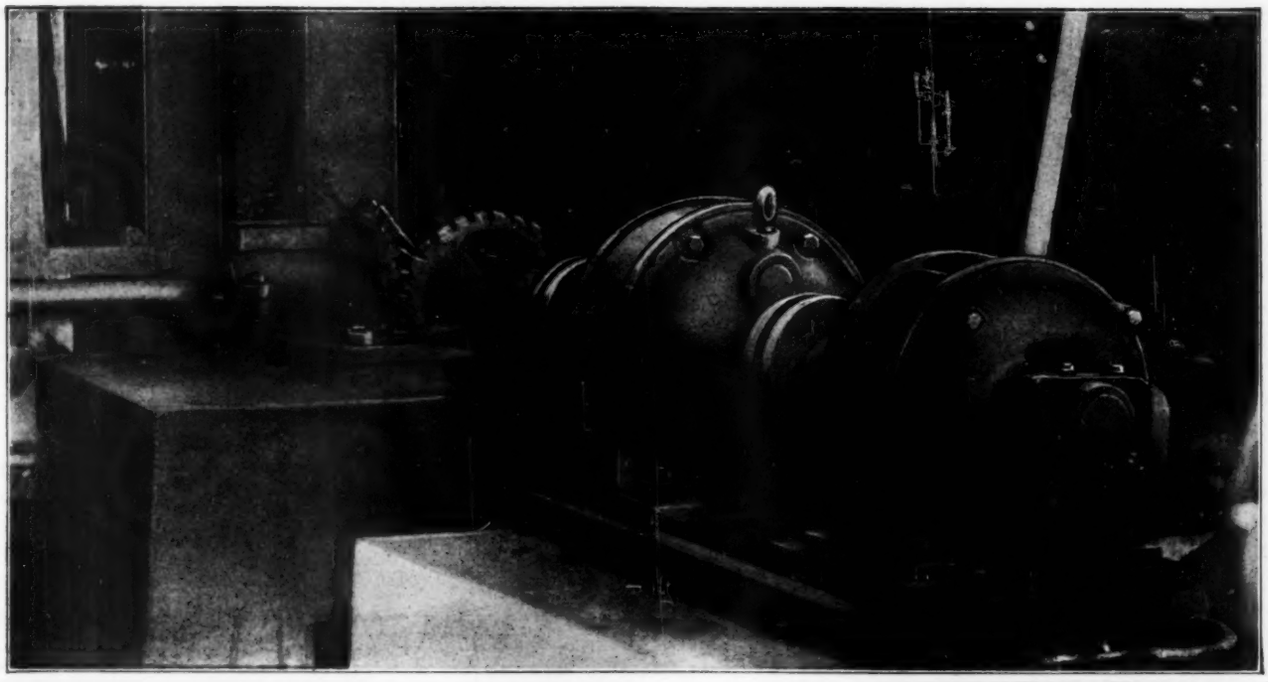

Jones Speed Reducer driving a Conveyor in a Cement Mill. Motor speed, 720 R.P.M. Final speed, 73 R.P.M. Ratio, 9.88 to 1.

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Power economy recommends the high speed "prime mover"—the electric motor. And power economy recommends the unit drive—a motor to its machine.

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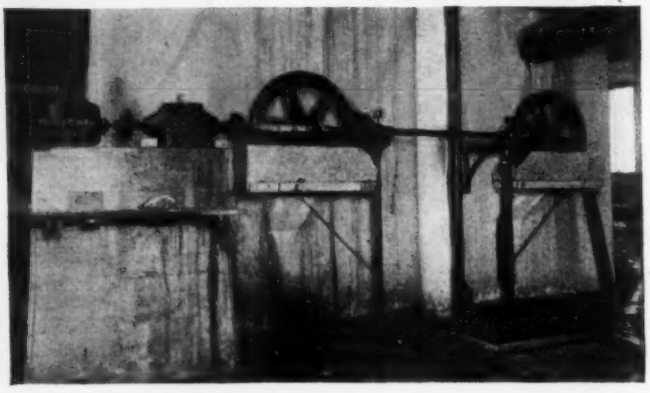
and Power Transmitting Machinery

Palmer-Bee Speed Reducers Serve Wide Range of Industries.



Palmer-Bee Mill Type Speed Reducers are in regular service no matter what the industry may be as long as the reduction of speed must be accomplished.

With many exclusive features incorporated in the design of Palmer-Bee units, these reducers can be profitably used in many places in your plant. Savings in floor space, power and maintenance expense, together with the elimination of the accident hazard, will more than compensate you for the initial investment.

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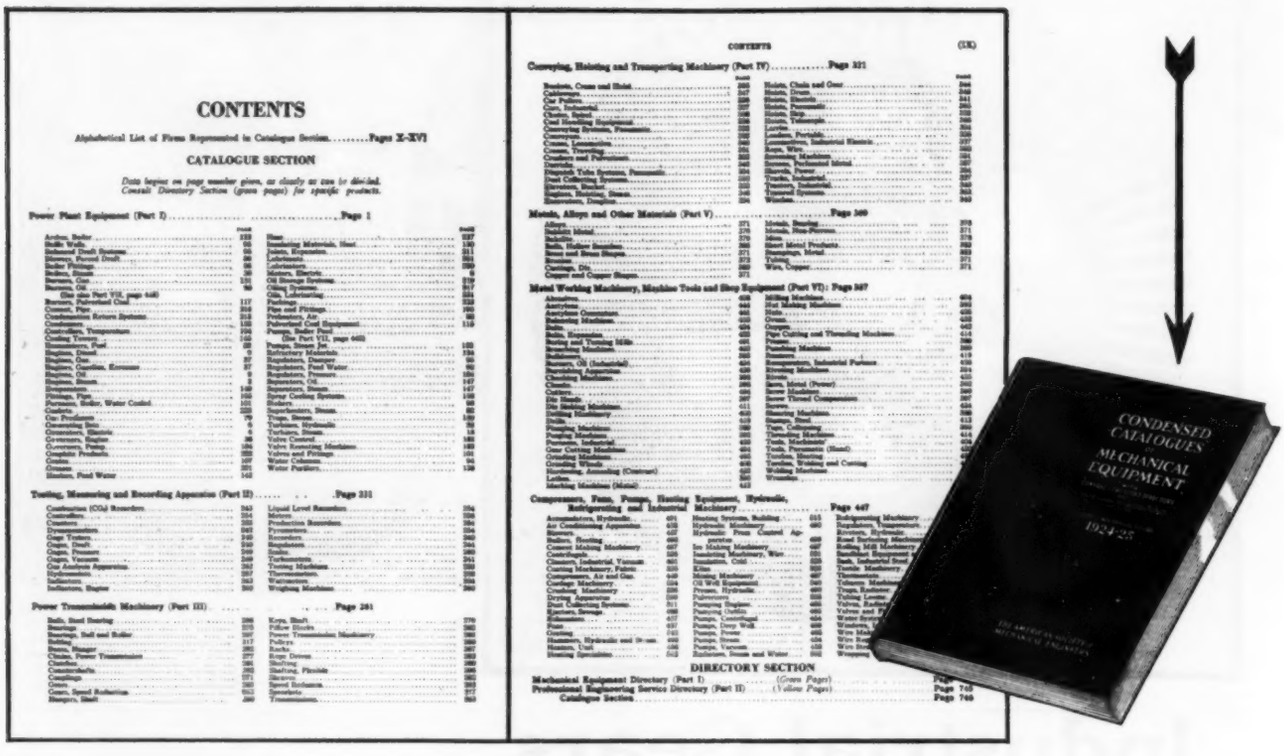

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The concise and accurately classified data contained in the work serves as a handy substitute for individual catalogues when not immediately available; as a ready index to those already on file; and as a basis of inquiry for complete catalogues, prices, etc., when required.

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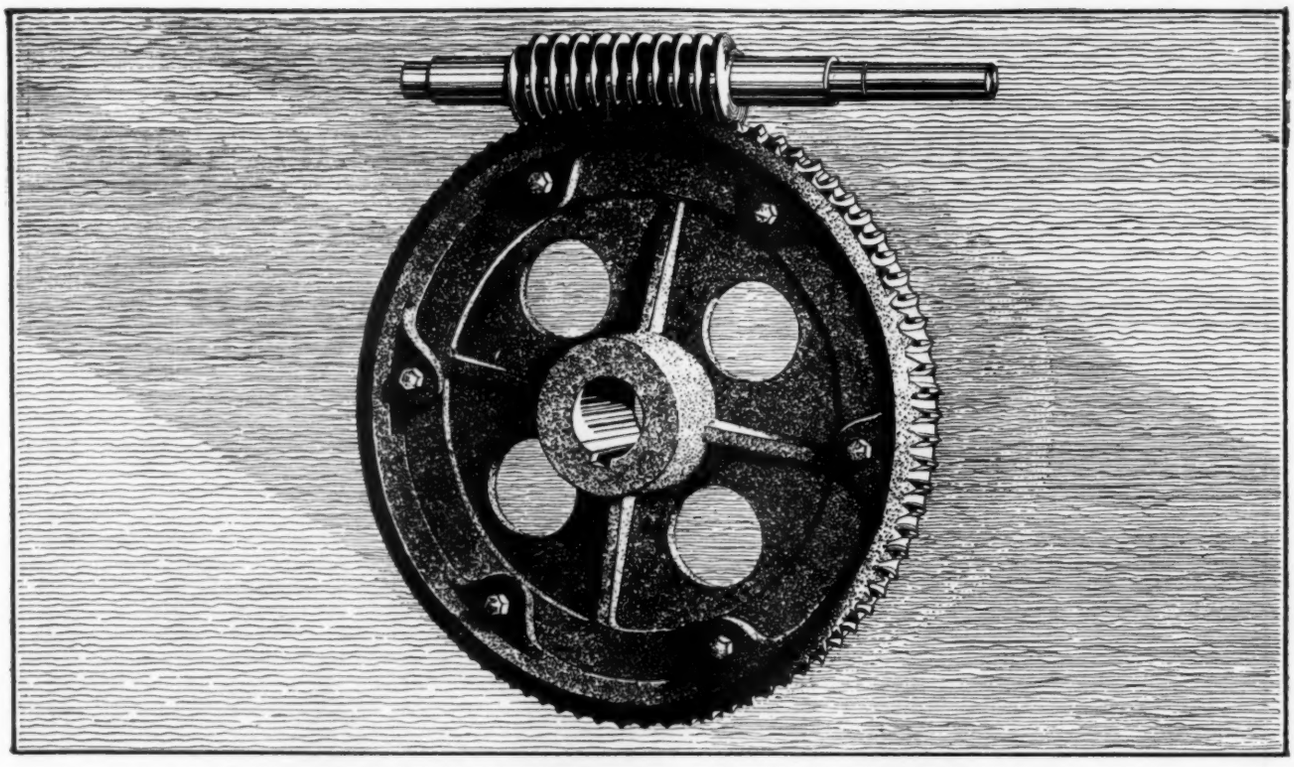

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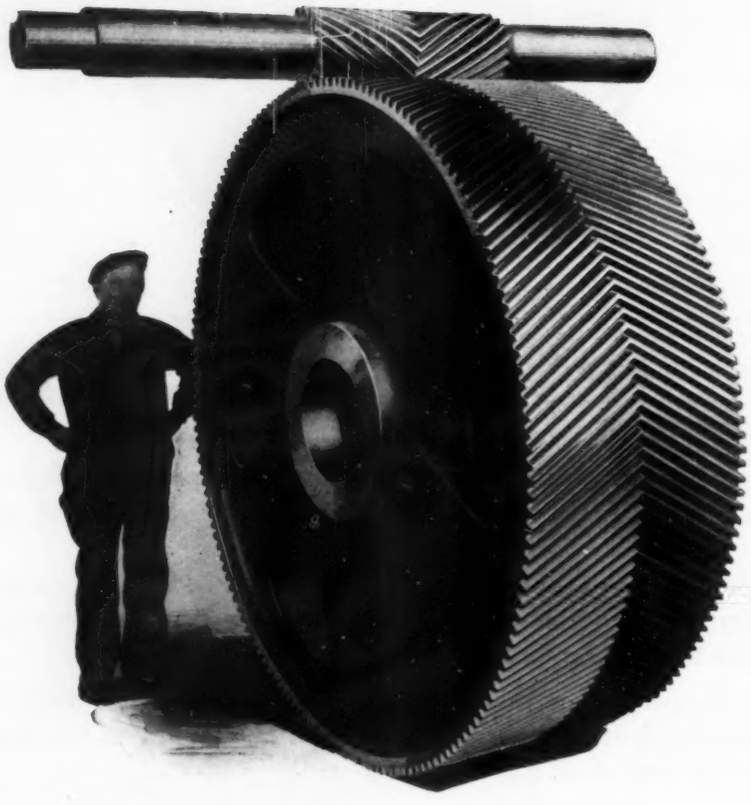

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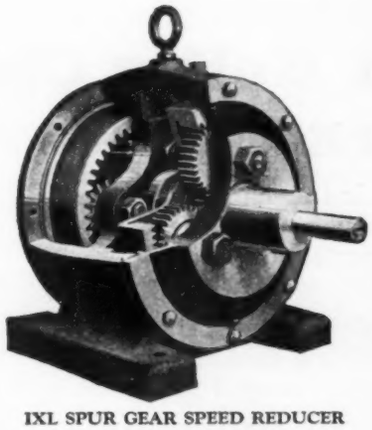

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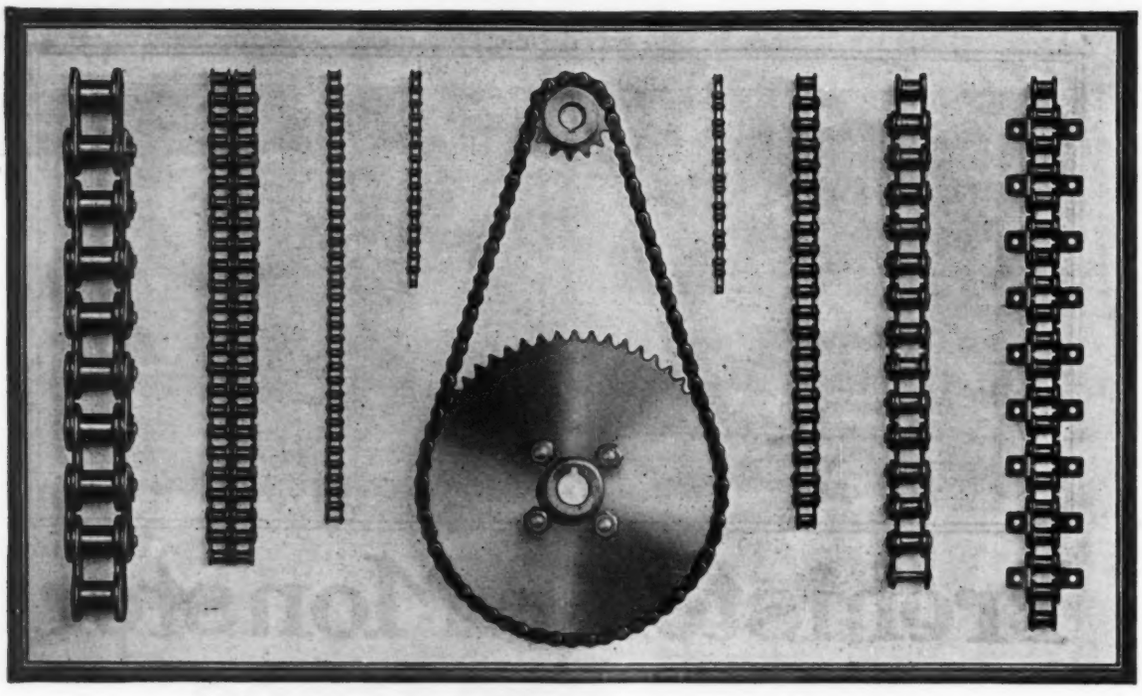

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They give longer service per unit of cost.

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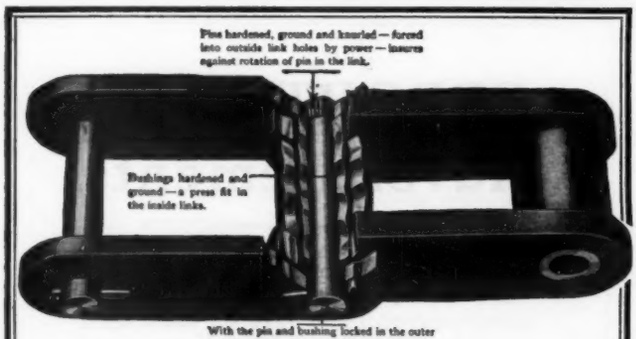

With the pin and bushing locked in the outer and inner links respectively, wear is evenly distributed over the entire length of pin and bushing.

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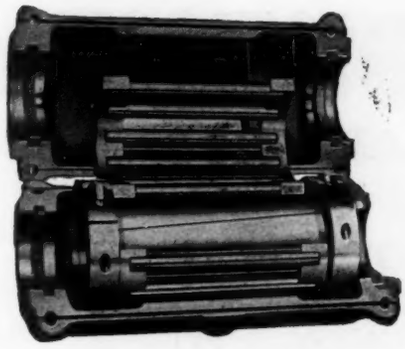

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Did you ever drive your motor car with the emergency brake on? Then you know just the "drag" that you are putting on your shaft and prime mover with old-fashioned bearings.

And it would be expensive, too, to operate your car with the emergency brake on, wouldn't it? Imagine then the bill you are paying for using old-fashioned bearings.

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Let us talk with you about substituting Sells Bearings. We have an Engineering Department right ready now to go to work with you.

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No matter what the requirement, there is a Gurney Ball Bearing especially made for that purpose.

Gurney Maximum Service-Maximum Capacity type bearings, including Radial, Radio-Thrust, Duplex and Double Row bearings, have the peculiar merit not found in any other design of ball bearing in that they have the maximum number of balls of maximum diameter for any given size of bearing, thereby giving maximum capacity with minimum unit stresses in materials. These bearings are suited for heavy loads and hard service at all speeds.

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We have a type for your needs—write for the assistance of our engineers.

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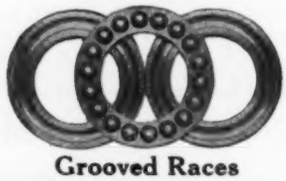
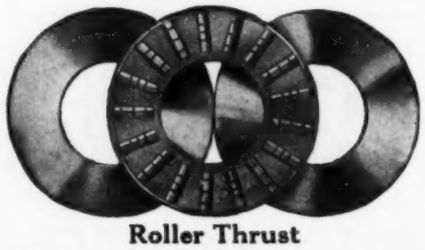


Grooved Races



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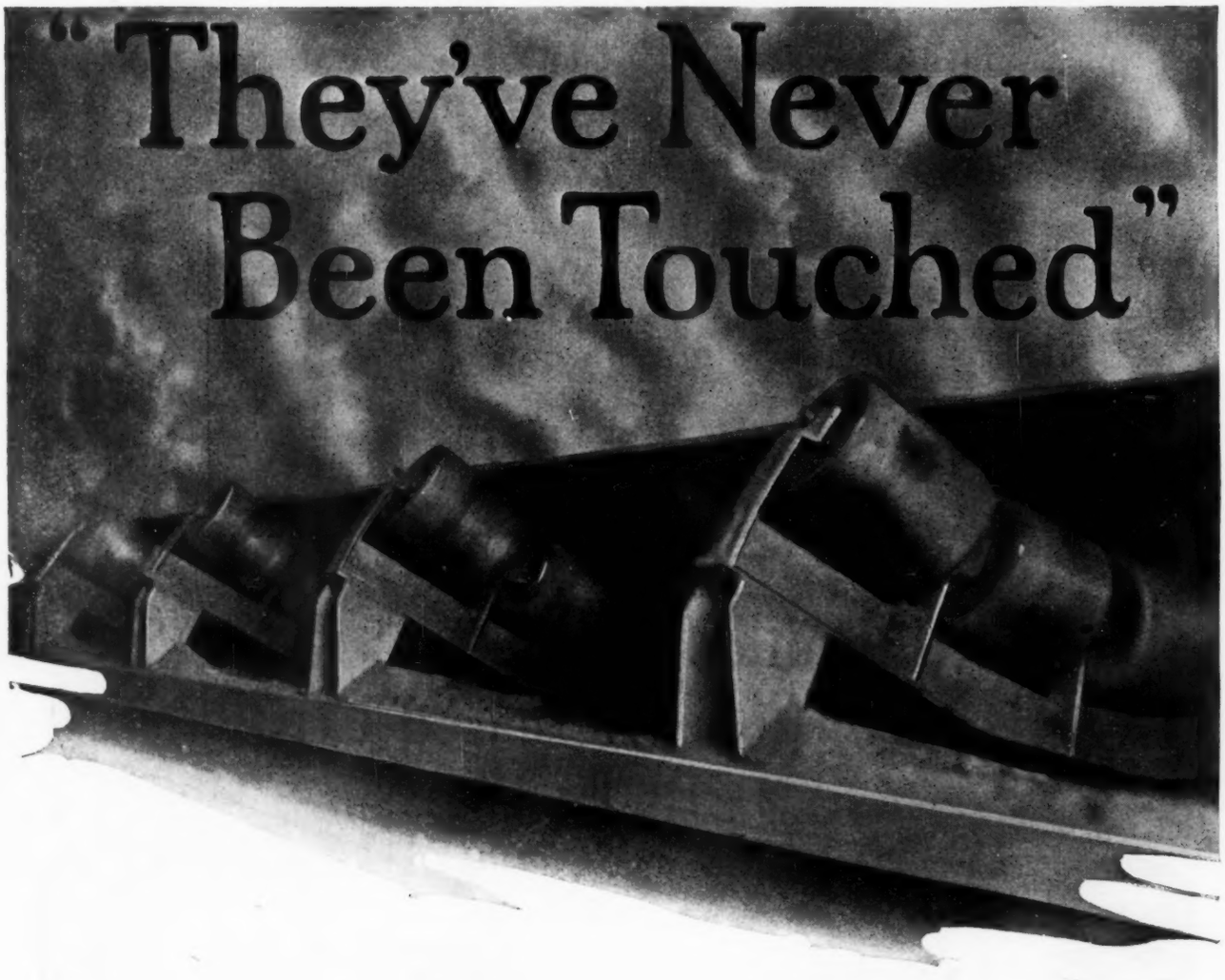

IN checking up the various Timken-equipped conveyors installed within the last few years, it is surprising how often one hears: "The bearings have never been touched!"

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"The rolls are all running freely."

"These conveyors have been in constant operation every working day since they were installed."

There are many reasons behind these statements. Six conveyor manufacturers, who have standardized on Timken Bearings, will be glad to give you the reasons. Let us put you in touch with these manufacturers.

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INDUSTRIAL DIVISION
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Multiplied Power Without Increased Cost

Power can be increased 30% to 40% by Strom Ball Bearings

MANY manufacturers find it necessary to increase production without adding to the investment in equipment.

Strom Ball Bearings will reduce friction to such an extent as to make possible marked savings of power. Great economies of operation result from this improvement.

Strom Ball Bearings are the best ball bearings money and skill can build. Made of special chrome steel they are heat-treated throughout to insure uniformity, hardness, elasticity and durability. They are machined with scientific precision. And they wear well, giving new satisfaction year after year.

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Single-row deep-groove Standard type, radial bearing

Double-row, deep-groove Standard type, radial bearing

Angular contact bearing, combination radial and thrust

Double-row, maximum type, radial bearing

Single-row, maximum type, radial bearing

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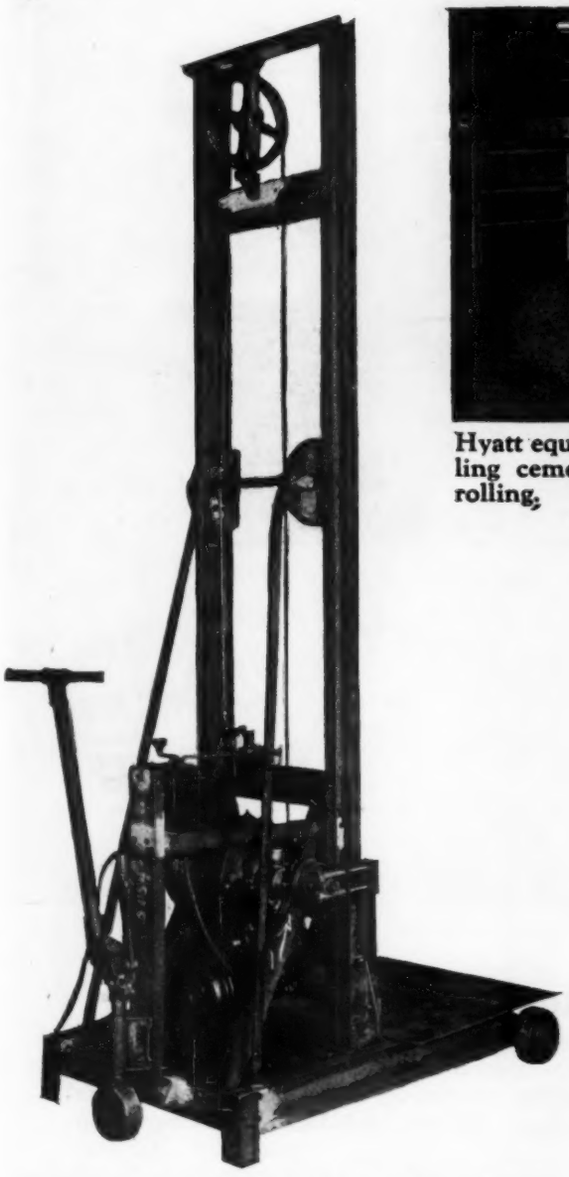


Type P stacker built by Lewis-Shepard Company, Boston, Mass. Equipped with Hyatt bearings and has worm drive running in oil, with no exposed gears.

Hyatt equipped Lewis-Shepard Jacklift handling cement blocks. Easy lifting and easy rolling.

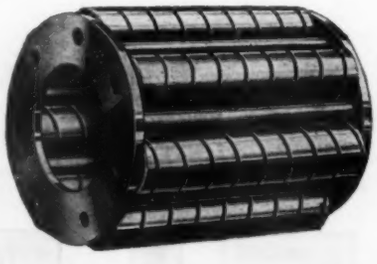
Built Right For Hard Service

THE demands of present day handling methods call for equipment well designed and constructed of high grade materials—capable of performing creditably under adverse conditions and actual abuse.

An index of the quality and of the ability of Lewis-Shepard lift trucks and stackers to stand the gaff is the Hyatt roller bearings with which they are equipped.

Manufacturers and users have proved the value of these bearings. They are agreed that bearings which permit smoother operation, yield substantial economies and provide the strength necessary for heavy duty and long life are not only well worth having—they are a virtual necessity.

When buying equipment for *your* plant or warehouse be sure that it operates on Hyatt bearings. That is a real guaranty of reliable money-saving performance.



HYATT ROLLER BEARING COMPANY
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WORCESTER PHILADELPHIA PITTSBURGH
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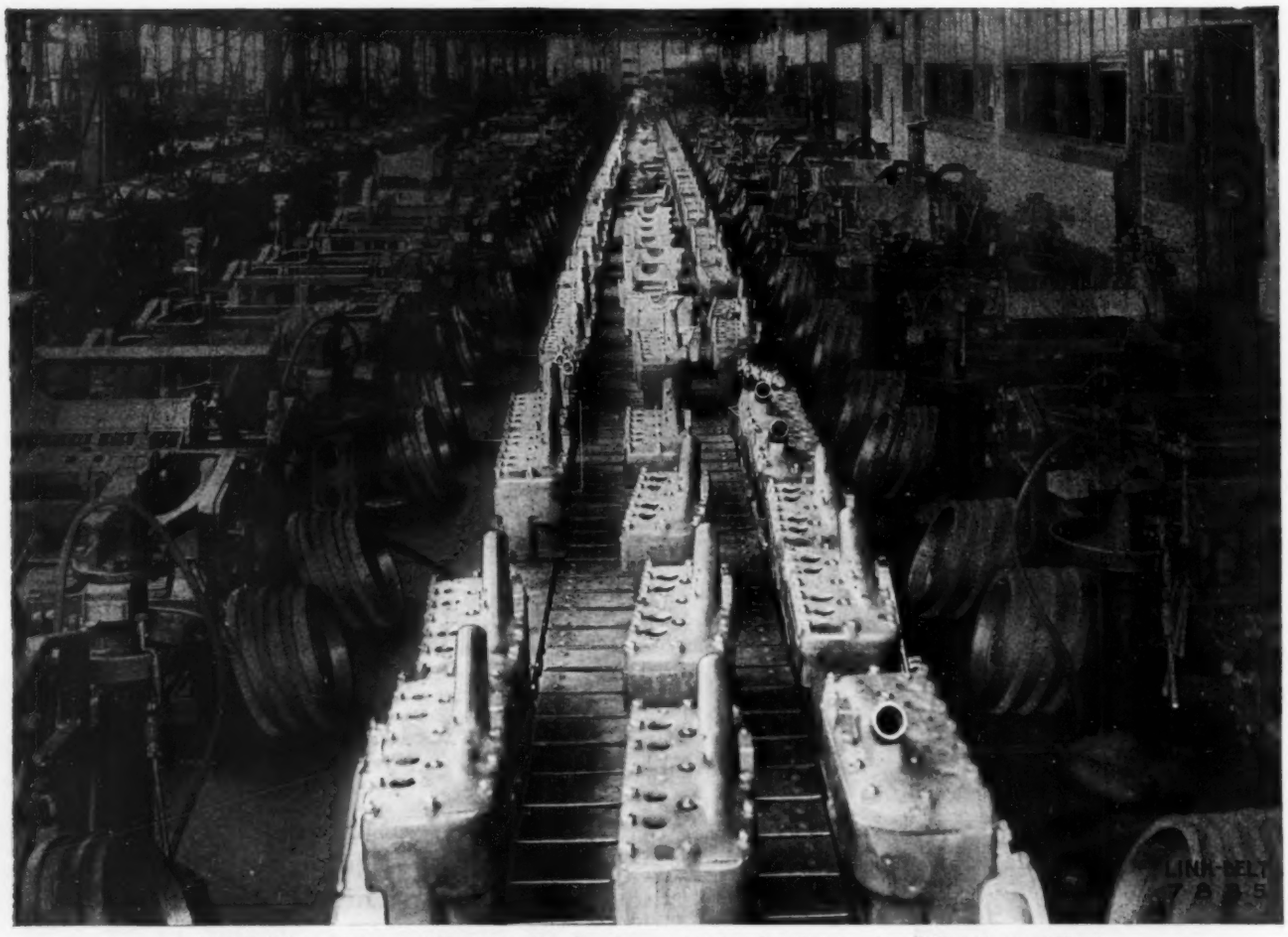
HYATT ROLLER BEARINGS FOR TRUCKS OF ALL TYPES



Link-Belt Apron Conveyor delivering motors from basement to first floor for assembly, Willys-Overland Plant

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Conveyors for all materials.
Locomotive Cranes.
Crawler Cranes.
Electric Hoists.
Skip Hoists.
Portable Loaders.
Silent Chain Drives.
World's largest manufacturers of Elevating, Conveying and Power Transmission Machinery.

Send for catalogs.

one that would mean thousands of dollars yearly in additional profits, through savings effected by more economical material handling—with modern, efficient Link-Belt conveying equipment.

Just as Ford, Willys-Overland and many other prominent manufacturers find Link-Belt equipment a means to increased, lower-cost production, so you may find similar economies possible in your plant.

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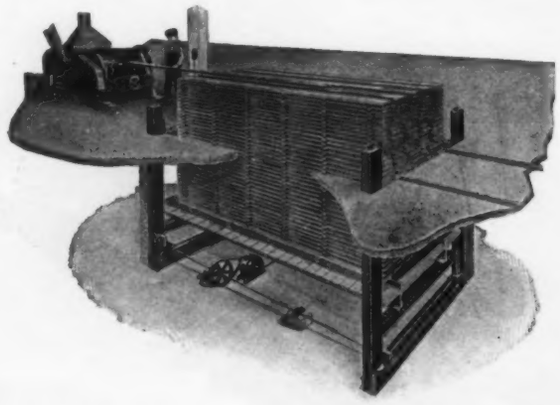

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It comprises 150,000 volumes, including many rare and valuable reference works not readily accessible elsewhere. Over 1,300 technical journals and magazines are regularly received, including practically every important engineering journal in the civil, mechanical, electrical, and mining fields.

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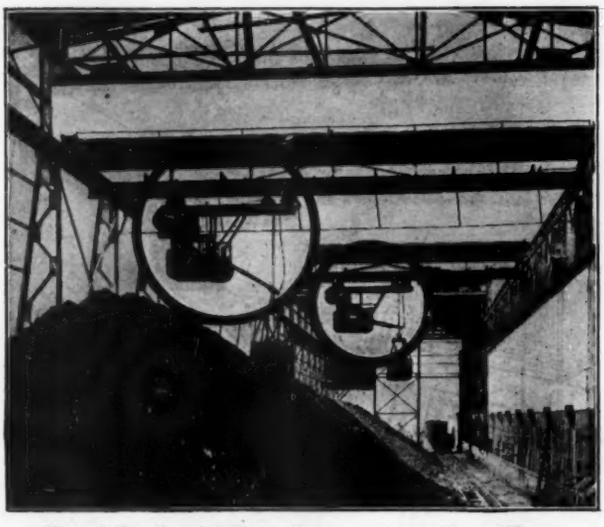

Shepard Cage Operated Electric Hoists running on Shepard Transfer Cranes, which convey coal from car to storage to boiler room.

Cut Power Production Costs

Executives report remarkable savings handling coal and ashes with Shepard Equipment. Applied to any plant, large or small, it lowers power production cost by "putting coal in the boiler room" at a very low figure, and by removing ashes at a substantial saving.

400% saved

For instance, F. J. Helbling, Chief Engineer of Consolidated Ice Co., Philadelphia, reports "400% saving of ash handling equipment," using a Shepard Lift-About as shown below.

The Shepard line includes electric cranes and hoists in capacities of 500 pounds to 30 tons. It is backed by over 20 years of experience of the largest manufacturer of electric hoists in America. Write for descriptive bulletins. Our engineers are at your service.

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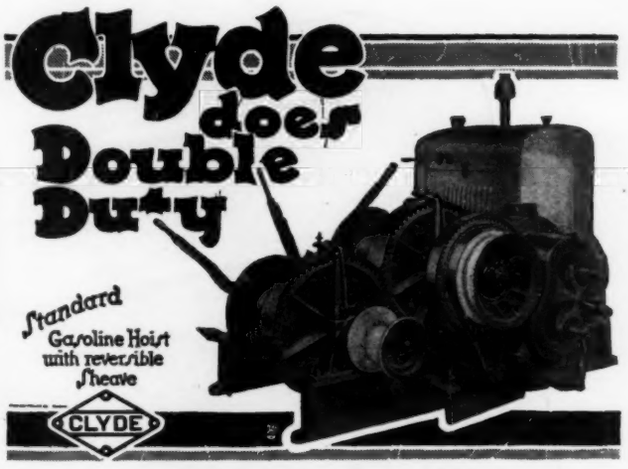
Shepard LiftAbout, 1/2 and 1 ton electric hoist, handling ashes at the plant of the Consolidated Ice Co., Philadelphia.

Clyde does Double Duty



"One of our Clyde Hoists is working on an eight story building and frequently operates a double cage brick hoist as well as a concrete tower at the same time. This has never been equaled by any other type of engine we have owned."
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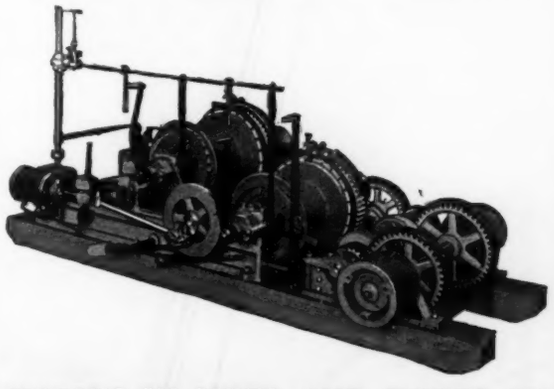

HOISTS IN SIZES AND TYPES TO MEET EVERY HOISTING DUTY

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When You Buy a J&L~*you get production* ~*n*

Shop Problems

This is the first of a series of pamphlets on the work of Your Shop and Our Shop. They will be published at longer or shorter intervals and in the following order:

1. **Equipment**
2. **Bar Work**
3. **Chucking Work**
4. **Controlling Overhead**
5. **Training Workers**
6. **Designing Parts for Production**
7. **Threaded Work**

The problems of our shops of average size are different, and we have neglected them. This is unfortunate, for the small and moderate-sized plants play a mighty part in carrying on the work of today. They outnumber the high-production places 100 to 1, and it is probable these medium-sized shops employ in the aggregate a much greater number of workmen. It is for these reasons that we are inviting your attention back to the every-day work of the every-day manufacturer and workman, with the hope of thereby rendering a useful service in this important field.

We are using our own shops, the shops in which the "J & L" Flat Turret Lathe has been built for more than thirty years, as the basis of our illustrative material. Not all the work described comes from there. It does come from other shops of a similar character, doing work in a similar way. The methods described have proved successful, whatever their source. They may be adapted to the needs of your shop, or they may not; but whether or no, they should have suggestive value.

We will exhibit the Hartness Dies, Hartness Screw Thread Comparator and Flanders Ground Taps at the Power Show, Grand Central Palace, New York, December 1-6

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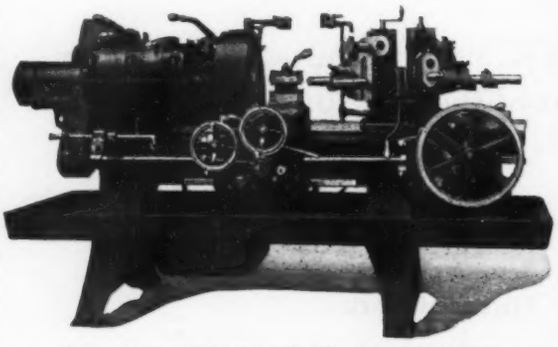
New Warner & Swasey 1-A Turret Lathe



New 1-A Turret Lathe with Chucking Equipment

2½ in. x 26 in. Bar Capacity
12 in. Chuck Capacity.
16¾ in. Swing over the bed.

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The Heavy Accurate Cuts it takes
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Equal Efficiency for Bar or Chuck Work

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But while there may be only one kind of set screw for *you*, there are two kinds sold:—the cold-drawn "Allens," and others.

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No. 62—Power Arch Presses and Open Back Gap Presses
No. 63—Straight Sided Single Crank Power Presses and Trimming Presses
No. 64—Double Crank Power Presses (Built Up Frame)
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Bolt and Pipe Threading Machinery

A complete description and detailed specifications of Landis bolt threading die heads and machines, pipe threading die heads, pipe threading and cutting off machines and automatic screw cutting die heads will be found on pages 416-417 in the 1924-25 volume of the A.S.M.E. Condensed Catalogues.

Landis Machine Company, Inc.
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In addition, the Hele-Shaw equipped machine has these special advantages over machines equipped with fixed stroke pumps

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These big advantages are the result of novel and ingenious design—the outstanding feature of which is a variable stroke by means of which the discharge can be instantly varied both in volume and direction.

The profusely illustrated catalog gives full details. All designers, builders and owners of machines, engines and machine tools should have a copy of this catalog. Write for yours—today!

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Combustion
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Copyrights
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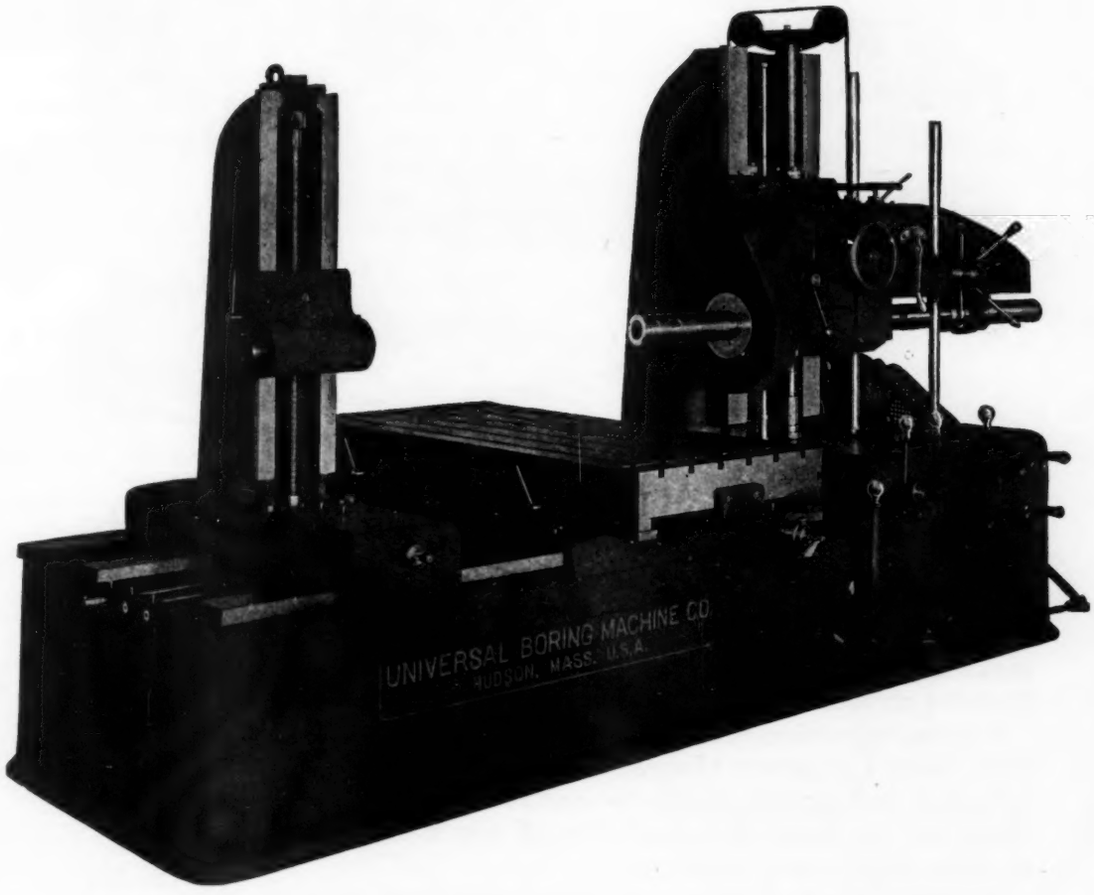

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One of our Service Men reports that Machine No. 4510 is not only giving good satisfaction, but that the Works' Manager made the statement that it would pay for itself, in cost saving, in fifteen months.

This Machine will be a profitable one to use for at least fifteen years.

"Where Accuracy Counts, We Win."

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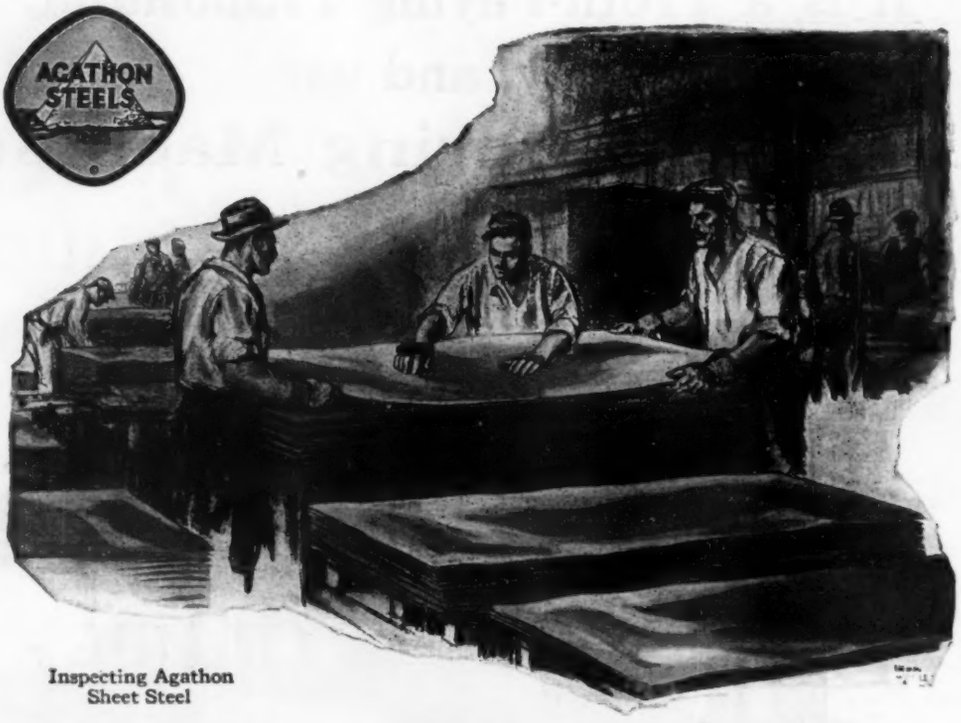

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Careful inspection of each sheet by these highly trained men, insures shipment of clean, smooth, highly polished material; and modern pyrometer control of all annealing furnaces, eliminates the possibility of any variation in drawing and forming qualities.

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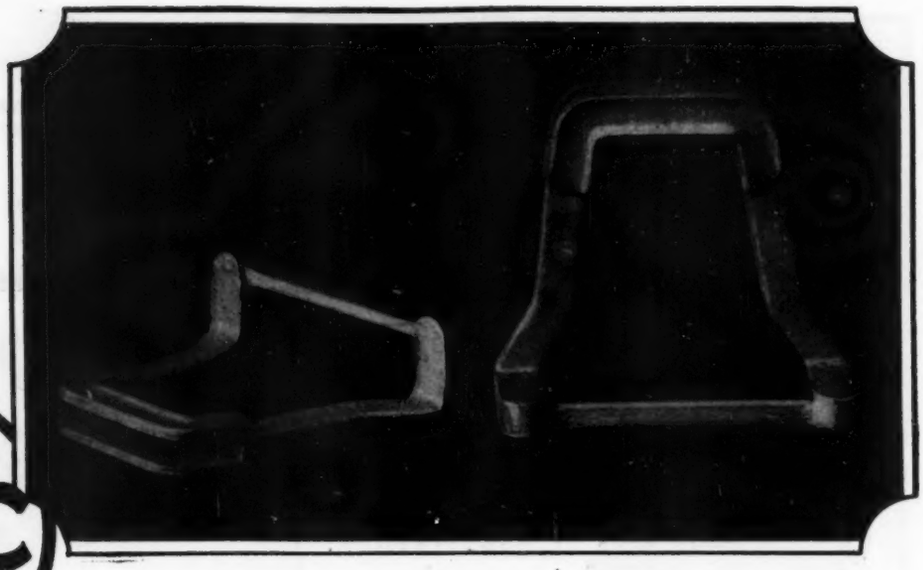

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These castings are part of a steam meter. In service they are exposed to strain and to the temperature and moisture of live steam.

The original equipment included two tin base brackets. Severe breakage, however, demanded a stronger and better suited alloy.

We die cast them of aluminum bronze—a copper base alloy that resists corrosion and fatigue under strain and high temperature.

Aluminum bronze has a tensile strength of 70,000 lbs. per sq. in. Its Brinnell hardness number is 100—110 and it offers a most remarkable resistance to alternating stresses.

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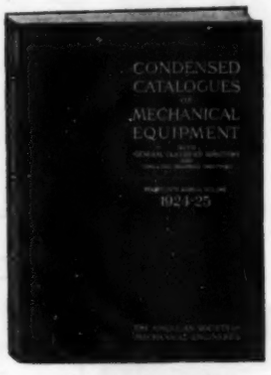

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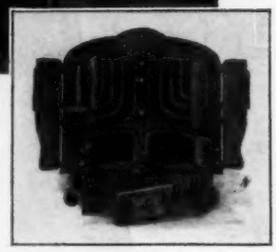

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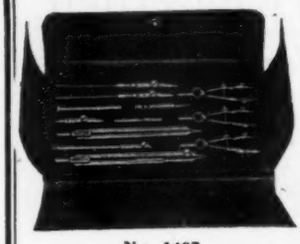

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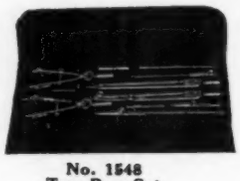

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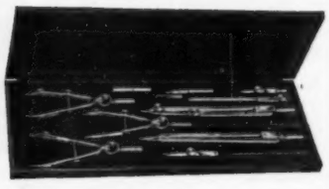

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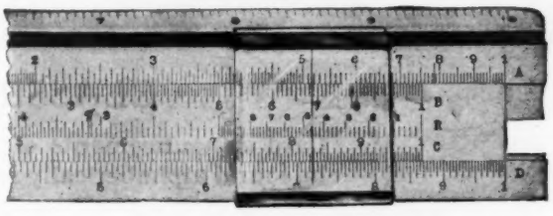

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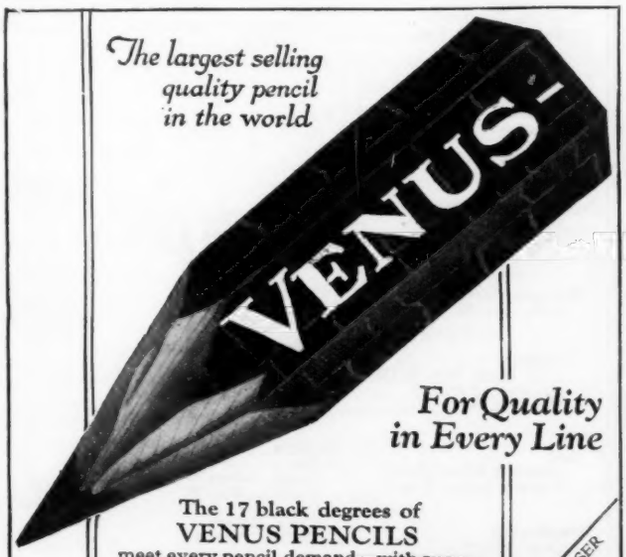

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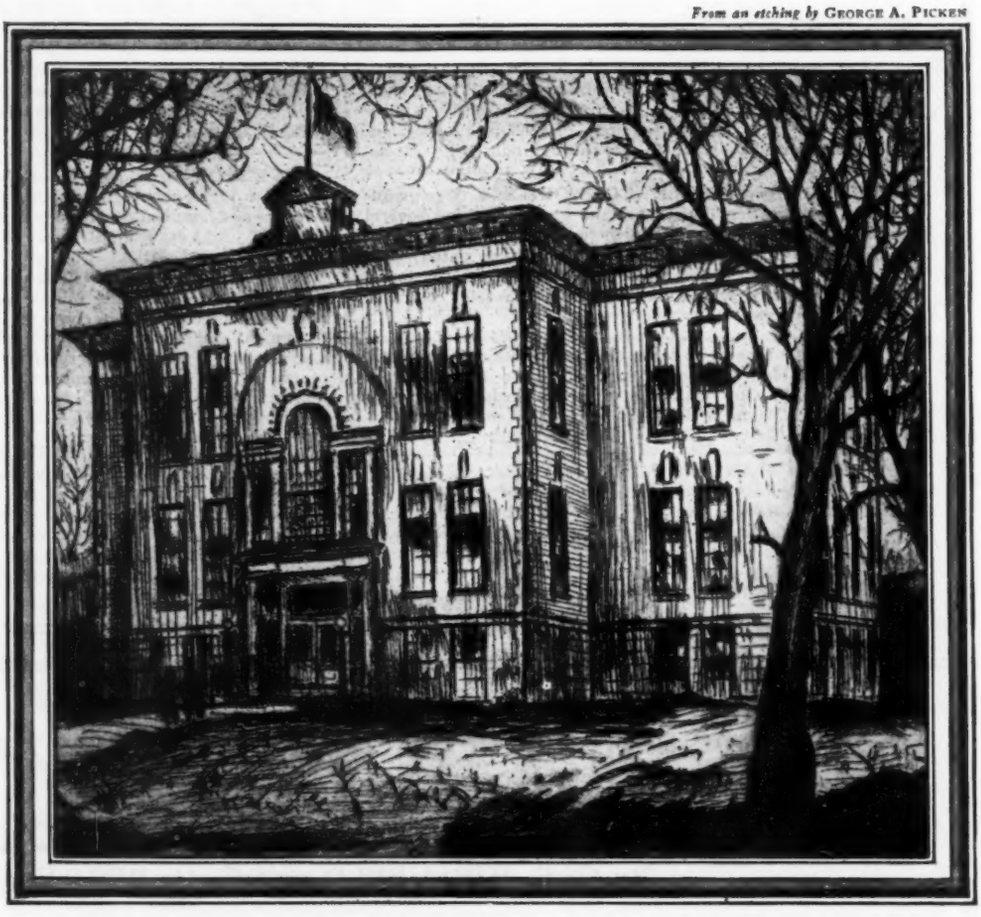

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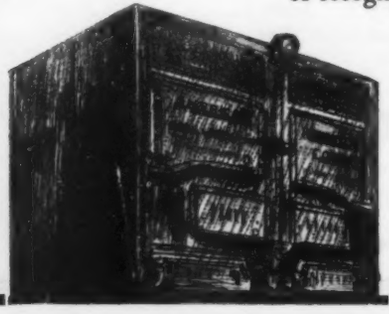

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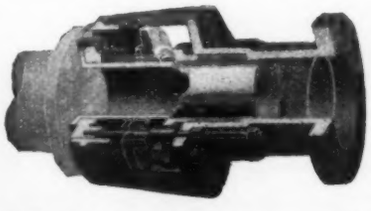

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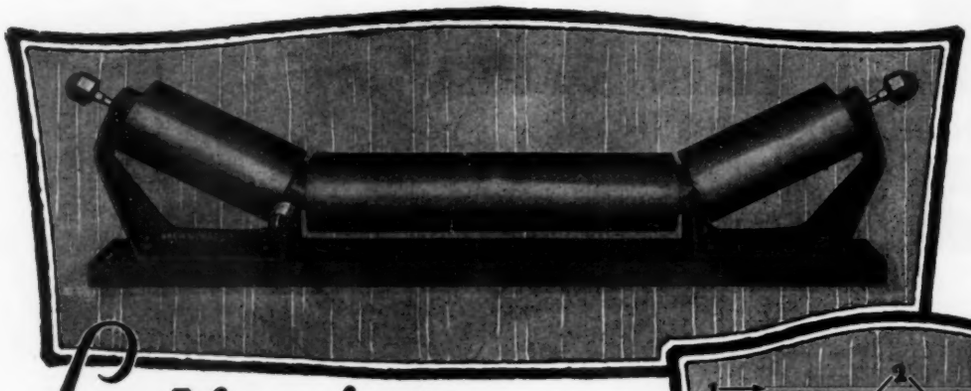
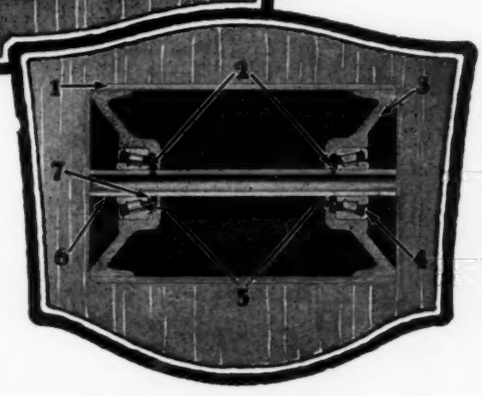
*Catalogue data of firms marked * appear in the A.S.M.E. Condensed Catalogues of Mechanical Equipment, 1924-25 Volume*



Looking into Troughing Idler Construction



To watch them running, all troughing idlers look pretty much alike. Down inside is where the frictional resistance comes and this is quickly followed by excessive wear and idler trouble. Looking into your idler construction is, therefore very much worth while.

The inside of the pulley of a Brownhoist roller bearing idler clearly indicates two of its superiorities—the never failing service of its Timken bearings and the positive lubrication system that requires attention only once a year.

The many good features of both Brownhoist roller and plain bearing idlers are described in Catalogue M-24, which has recently been published. Send for a copy for your files.

1. Cold drawn seamless steel tubing.
2. Hole in shaft for greasing bearings, causing grease to be forced through the bearing to the outside of pulley.
3. Cast iron head pressed into steel tube.
4. Steel washer pressed into cast iron head forming dust protection for Timken roller bearings.
5. Timken roller bearings.
6. Hollow shaft made of cold drawn seamless steel tubing.
7. Large grease chamber, requires filling only once a year.

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Cleveland, Ohio
Branches: New York, Chicago, Pittsburgh, New Orleans, San Francisco, London, Eng.

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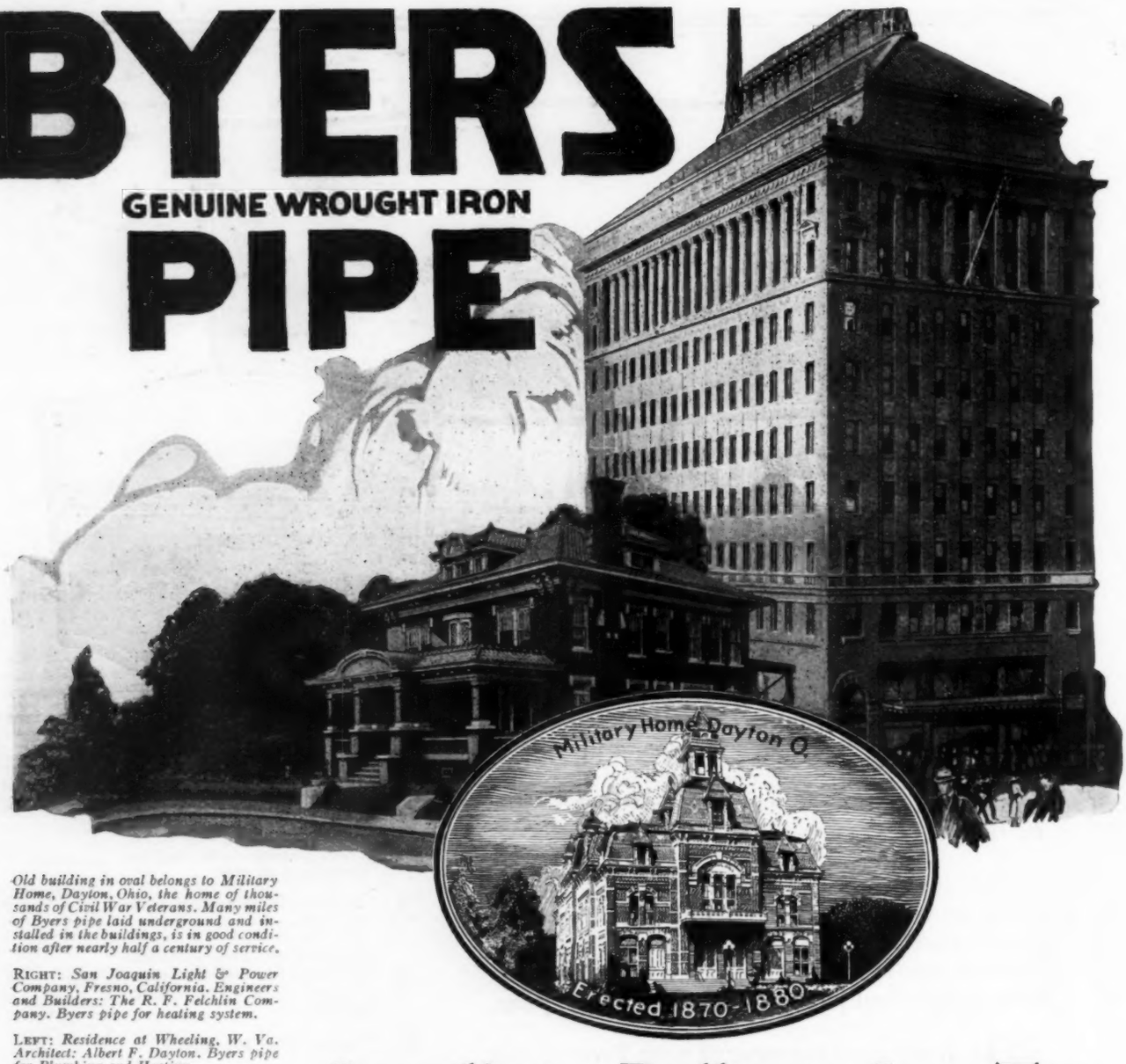

Old building in oval belongs to Military Home, Dayton, Ohio, the home of thousands of Civil War Veterans. Many miles of Byers pipe laid underground and installed in the buildings, is in good condition after nearly half a century of service.

RIGHT: *San Joaquin Light & Power Company, Fresno, California. Engineers and Builders: The R. F. Felchlin Company. Byers pipe for heating system.*

LEFT: *Residence at Wheeling, W. Va. Architect: Albert F. Dayton. Byers pipe for Plumbing and Heating.*

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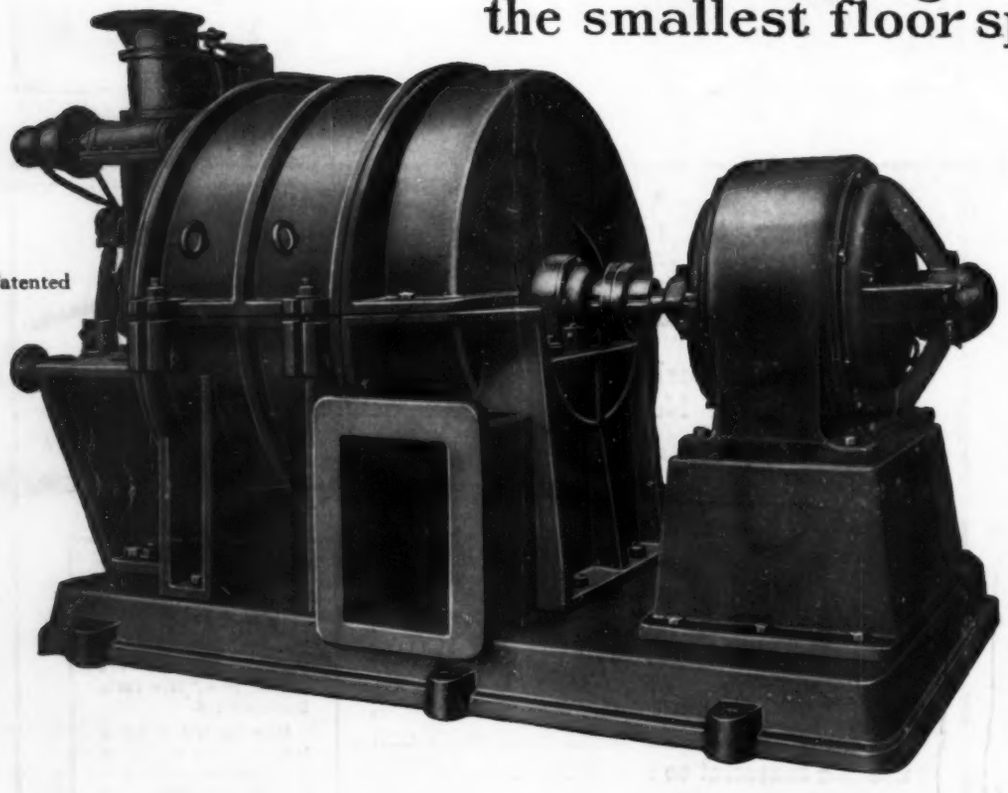

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